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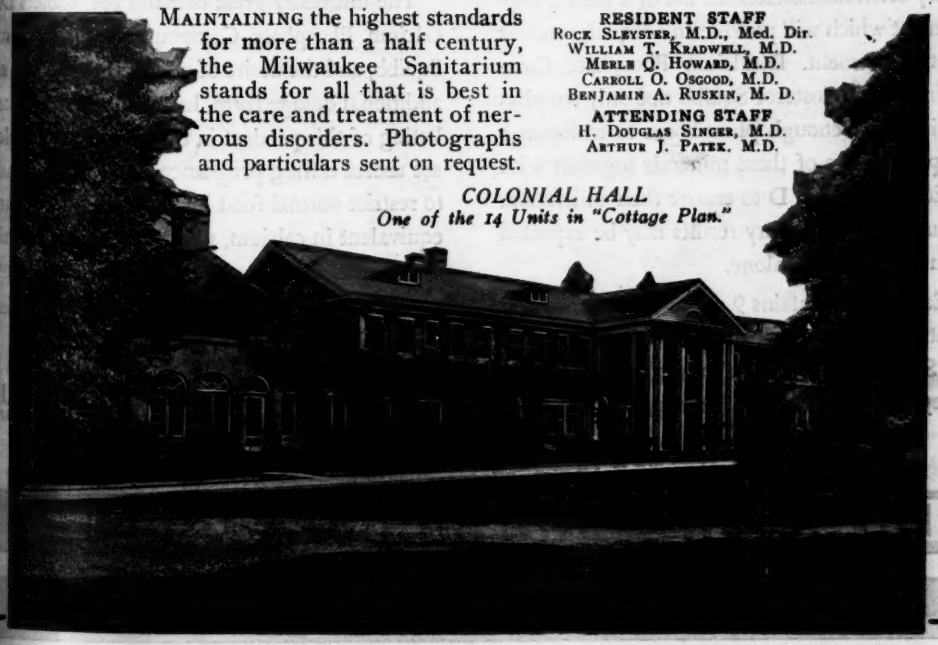

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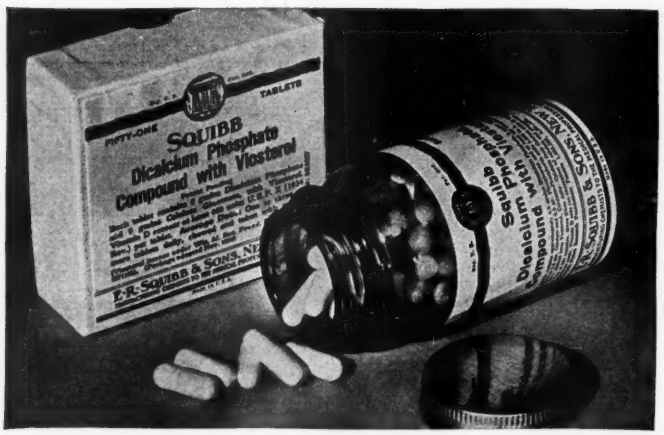

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ILLINOIS MEDICAL JOURNAL

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ILLINOIS MEDICAL JOURNAL

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Editorials

BUREAUCRATS REFUSE HISTORY'S LESSON

BUREAUCRACY RUINED ROME. UNLESS IT IS CHECKED IT WILL RUIN AMERICA

Some time since the Editor of the ILLINOIS MEDICAL JOURNAL pointed out the equivalence between the pre-debacle conditions of ancient Rome and the condition into which bureaucrats, socialists and communists are attempting to push our country, on the lever of unseemly and crushing taxation.

The following comments from contemporary authority are of interest in their parallelism of viewpoint.

The late Herbert Hadley, former governor of Missouri, in his able book, "Rome and the World Today," in which he incorporated much of his findings as an educator, economist and student of history, drew, among other conclusions, that "Destroying the right of private ownership of property, denying to a man of talent and ability the right to advancement or extra reward for his services, brought upon the Roman world a social, industrial and economic breakdown that was the natural result of these efforts to run counter to the inflexible rules of human nature and the inexorable laws of supply and demand. Then, as always in the history of the world, have such efforts not only failed but produced a melancholy train of misery and misfortune. Hope and ambition were banished from the hearts and minds of men."

Commenting upon which and writing in the *Saturday Evening Post* of July 20, 1935, says Raymond G. Carroll:

"The Roman Emperor Diocletian, in 301 A.D., promulgated an edict fixing a maximum price for provisions and other articles of commerce, and a maximum wage for every service, whether *by a common laborer, an experienced lawyer or physician.* He was warned against price fixing

and wage making by the abortive attempts in the same direction by the Assyrians, the Persians and the Egyptians centuries before, but all experience was brushed aside.

"There was but one penalty for a violation of the edict of Diocletian, engraven on stone and set up in every market place throughout the Roman Empire, and that was death, both for the one who asked for an excess of the official price and for the one who paid it. Deportation was an alternative penalty in extreme extenuating cases. *Trade was thus forbidden to fluctuate, exactly as now, and no allowances were made for differences of conditions of production or transportation.*

"What happened in Rome? The Diocletian edict, plus the commercial speculation of insiders and several bad harvests, ruined the commerce of the empire. The depreciation of the currency that followed brought about a return to a system of barter, and Romans no longer bought and sold on credit or with the aid of money. Under Diocletian, the Senate became a political nonentity, the last traces of republican institutions disappeared and were replaced by an absolute monarchy approaching to depostism.

"Later, under the Codex Theodosianus, a collection of imperial constitutions for the benefit of public officials, arranged by Theodosius II, emperor of the East, we find Roman bureaucracy at its apex. Every new condition had been given a new law, and every new law received a new official or bureau to enforce it. The end was that the machinery of government in the fifth century became so cumbersome and so complicated that in the increasing incapacity and disorganization of those times it almost ceased to function. *Thus ancient Rome died, east and west.*

"The practice of establishing a new bureau or commission to deal with every new problem of government or to correct every real or imagined evil has been the outstanding earmark of the New Deal. The result has been, as with Rome, the creation of a vast, burdensome and costly bureaucracy, which criticism, based upon the judgment of past times, insists will prove more of an evil than those which it was created to correct."

EVERY PHYSICIAN IN ILLINOIS SHOULD BELONG TO THE STATE MEDICAL SOCIETY

Doctor, read carefully what you will receive from membership in the Illinois State Medical Society.

The local medical society is the bulwark of the physician.

Money spent in dues for a state or local medical society is one of the safest, surest investments a physician can make.

For the nominal dues of approximately $10.00 a man gets medico-legal protection and his fellowship in the society of his confreres, as well as eligibility to membership in the American Medical Association.

The dues vary in the respective counties, from $7.00 downstate to $10.00 in Cook County per year, depending upon the local activities of the county society in which you reside. Illustrative of the benefits secured from such affiliation rate the following:

1. For approximately $10.00 per year you get medico-legal protection; membership in your County and Illinois State Medical Societies and the ILLINOIS MEDICAL JOURNAL. Membership in the above makes you eligible also to fellowship in the American Medical Association. Affiliation and association with this large, representative body of men is of great value and importance to every physician.

2. Medical Defense. Out of your annual dues paid, the trustees of the State Medical Society are required to turn $1.50 over to the "medical defense committee" for the protection and defense of members of the society against whom suits for malpractice or damages may be brought. For years the Illinois State Medical Society has been meeting all expenses of such litigation; that is, court costs, attorney's fees, costs of appeals, witness fees, the cost of record —no limitation being placed on this sort of expense of an individual case.

This means that if you become a member of the Illinois State Medical Society you will be defended in every effective manner possible against suits for damages for alleged malpractice, as well as attempted blackmail. This one feature alone is worth many times the cost of membership. Private defense companies are

charging $20.00 to $75.00 per year and upwards for the defense and indemnity.

Medical Legislation. Also $1.00 is set aside for a fund to be used by the Legislative Committee for the purpose of combating vicious legislation.

Members of the Illinois State Medical Society are also eligible to membership in any or all of the various affiliated special medical societies in Illinois.

3. Membership in the Illinois State Medical Society. All members of any county Medical Society are *ipso facto* members of the Illinois State Medical Society and will receive all publications of the State Society without any additional fees, dues or subscriptions.

Memberships in the state and local society are necessary before you can affiliate with the reputable professional societies of the country and the American Medical Association. In some states a year's membership in the local society is required before they can secure a license by examination or reciprocity.

4. The Journal of the Illinois State Medical Society. This Journal, owned and published monthly by the medical profession of Illinois, is sent free to each member. The official organ of the Illinois State Medical Society, one of the largest and most influential state organizations in the country, it is among the most comprehensive state medical journals, both in point of circulation and editorial scope. It ranks highly, both in size and in influence, with all medical journals. *Further, in the fight against economic evils oppressing the medical profesion, the* ILLINOIS MEDICAL JOURNAL *has been not only a leader, but ever a pioneer.* In the Journal is printed the proceedings of the Illinois State Medical Society; the papers presented at the Chicago Medical Society, which is the largest local medical society in the world. The Chicago Medical Society meets every week, and it has fifteen branches, proceedings of which also are printed in the ILLINOIS MEDICAL JOURNAL, as well as of eleven affiliated societies, namely: Gynecological, Pathological, Ophthalmological, Surgical, Urologocial, Laryngological and Otological; Orthopedic, Pediatric, Neurological, Roentgen Ray, Medical Legal. On the programs of these various societies appear from time to time a great many of the most eminent men of America and Europe. In the Journal also is published the papers read and the reports of all meetings of the respective county society meetings throughout the state, as well as all the news of interest to medical men in Illinois and throughout the United States. The price of the Journal for non-members is $3.00 per year. It is sent to all members of the Illinois State Medical Society, as one of the perquisites of membership.

5. Reformation of Medical Conditions. Many reforms are being carried on which in previous years were impossible. A few years ago the Medical Legislation Committee of the Illinois State Medical Society succeeded in having passed by the Illinois State Legislature what is considered the best medical practice act in the United States. This Societ yhas a representative as chairman of the committee in Springfield, and the committee is working to the good advantage of medicine in this State. The committee is receiving financial support from the State Medical Society as necessity requires. Every year different cults and branches of so-called medicine try to have special laws passed which will license them through examinations which do not conform to the medical practice act. It is only through large membership, financial and moral support that this type of legislation can be controlled.

Abuse of medical charities, illegitimate and unethical methods of practice, and all the other evils which have embarrassed the physician and reduced his income can only be successfully handled by a well organized and compact profession, able to take a positive stand on these matters and to carry out its decisions. There is in view (under thorough organization) relief from many of our present difficulties. There never will be devised a patent mechanism which will relieve the doctor of participations in our political activities. Physicians must govern themselves or they will be misgoverned.

6. Eligibility to Fellowship in the American Medical Association. The only way in which a physician can become a member of the State or National organization is through the local society of the County in which he lives. The advantages and privileges to be gained through membership in this great association need not be enlarged upon. Fellowship in the American Medical Association includes The Journal of the American Medical Association, the greatest weekly medical journal published in the United States.

7. Regulation of Pharmaceutical Prepara-

tions. The American Medical Association has established a committee, known as the Council on Pharmacy and Chemistry, for the purpose of examining, analyzing and reporting from time to time to the profession its findings on the most important proprietary preparations, such as the general practitioner is constantly being importuned to buy and prescribe for his patients. This movement, which is of vital importance to every practicing physician, deserves the support of all members of the profession, regardless of society affiliations. By becoming a member of your local society you will come more closely in touch with organized and systematic efforts for the uplift and benefit of the profession at large.

8. The Completion of Medical Organization in Illinois. The Illinois State Medical Society today comprises three-fourths of the reputable members in the State. It is to the interest of every physician in Illinois to complete and strengthen this organized and concerted movement on the part of the profession for the betterment of local conditions. The supression of quackery, the prevention of enactment of vicious legislation, and the consummation of other needed reforms can only be accomplished by complete and thorough organization and unanimity on the part of the profession of the State. In this work the support and cooperation of every reputable physician is requested.

The welfare of your profession depends upon the support you give it. A well-organized profession means greater respect and better compensation.

The Illinois State Medical Society desires your support and cooperation. Go to the next meeting of your local or county society and meet the other physicians of your neighborhood. Ask one of the officers of the society for an application blank, fill out the blank, either send or, better, hand it to the President or Secretary, together with the fee for membership in your county society, and thus secure membership in the organized profession of the state and participate in the benefits and privileges of medical organization.

Qualifications for Membership. Every registered physician residing in any county who is of good moral and professional standing and who does not claim to practice any exclusive system of medicine, shall be eligible for membership.

EDWIN R. EMBREE'S IDEAS MAY OR MAY NOT "PARALLEL THE PROGRAM OF THE MEDICAL PROFESSION"

Announcement that the Julius Rosenwald Fund plans to expend something more than 28% of a million dollars during the coming year for "the furthering of socialized medicine" and for "welfare work and rural education among colored persons" must strike a decidedly sour chord in the hearts of the thousands of underpaid—if paid at all—rural practitioners!

These are the men who have dared daily obscurity and high hazard in isolated, poverty stricken country communities and whose personal sacrifices in the causes of humanity and decent Americanism comprise a philanthropy of depth, breadth and richness such as is far beyond the most imaginative scope of the professionally philanthropic "endowment funds" and "foundations."

These are the men to whom socialized, professionalized humanitarianism is well known as the most venomous viper in our entire social structure, since it functions as destroyer when it pretends to be a universal healer.

Commenting on the situation, the Journal of the American Medical Association, under date of May 25, 1935, remarks, under the heading, "Rosenwald Fund Announces Plan for Socialization":

"The following item from the Chicago *Tribune* of May 20 indicates the plans of the Rosenwald Fund for the coming year:

"'Trustees of the Julius Rosenwald Fund voted yesterday an appropriation of $284,000 to be expended in the fiscal year beginning July 1 for welfare work and rural education among colored persons, and for furthering socialized medicine. Edwin R. Embree, president of the Fund, said that the Rosenwald effort to place competent medical service and hospitalization within the reach of persons of moderate means paralleled the program of the medical profession. He quoted Michael M. Davis of the Fund's medical division as reporting that 344 plans to cut the cost of medical care, or to make it easier for the average family to pay for it, had come to his office in the last year. Certain of these projects, he said, had been endorsed in principle by the American College of Surgeons.'

"The medical profession should be aware of this propaganda in behalf of state medicine. In the crystallization of public opinion, physicians

will do well to bring the point of view of the medical profession to the attention of their patients, women's clubs, Rotary clubs, Kiwanis clubs, chambers of commerce and similar organizations."

This comment of the J. A. M. A. is quite in keeping with the tenets so long preached by the ILLINOIS MEDICAL JOURNAL. It will be interesting to note how Edwin R. Embree's ideas "parallel the program of the medical profession." Mr. Embree may be a mind reader. He certainly is not a man of medicine, even if he is president of an endowment fund.

ONE SWALLOW OF SOCIALIZED MEDICINE WAS TOO MUCH FOR SOCIALIZER FILENE!

Edward A. Filene, organizer of the Twentieth Century Fund and one of the most ardent proponents for the practice of medicine by the laity, has just been having a stiff dose of his own medicine. We trust the therapy was to his liking. We may be excused for being a doubting Thomas in this regard, since Mr. Filene did not stick by his own prescriptions. In other words, though stricken with a severe case of pneumonia while on a visit to Russia, Mr. Filene was not willing to entrust himself to the mercies of that socialized medicine which he and scores of similarly misguided would-be philanthropists are so anxious to inflict upon the United States of America. For, while the Soviet dictator, Joseph Stalin, according to dispatches sent out by the Associated Press, ordered all medical facilities of the Kremlin placed at the Boston merchant's disposal, an appeal for help was made to Nazi Germany, still decidedly capitalistic. "The Foreign Office wired the Soviet Consulate in Berlin to grant an immediate visa to the *German heart and lung specialist,* Prof. Fritz Meyer, so he could come here tomorrow by airplane," was the dispatch sent out from Moscow under date of Aug. 7 by the Associated Press.

The proletariat of Russia is deprived of all possibility of making such a cry from Macedonia as was the privilege of Mr. Filene. If Red Medicine so highly endorsed by the man who would be one of its godfathers in America is insufficient for him, how do the suffering millions of Russia's own poor manage with it? Yet that is the sort of medical care that Mr. Filene and his friends are mixing up for the United States citizenry.

The whole thing smacks somewhat of the adage

"When the devil was sick, the devil a saint would be;
When the devil was well, the devil a saint was he."

A sick socialist is very apt to be a capitalist, when it comes to taking care of himself.

U. S. GOVERNMENT CONDEMNS SALE OF DINITROPHENOL

WEIGHT REDUCER CAUSES BLINDNESS

Dinitrophenol, Sold Under Many Names, Also May Damage Liver, Kidneys, Heart, Or Sensory Nerves. It Causes a Blood Disorder, and Even Death

Blindness from the use of dinitrophenol for reducing weight has not stopped the use of the drug in spite of repeated warning, says W. G. Campbell, Chief of the Federal Food and Drug Administration.

The eye cataracts observed in dinitrophenol poisoning develop with a rapidity and malignancy hitherto unknown, and result in total blindness within a comparatively short time. This drug may produce acute poisoning, the symptoms of which are nausea, stomach and intestinal distress, sweating, flushed skin, high fever, rapid breathing, and muscular rigor followed by death. The drug also damages the liver, kidneys, heart and sensory nerves. It produces agranulocytosis, a blood disorder also noted in cases of poisoning with amidopyrine, a common ingredient of medicines for the relief of pain.

The Food and Drugs Act, according to Mr. Campbell, is practically inoperative against this public health hazard. He says, "The only application of the law to these products is through some misstatement of fact or some false and fraudulent curative claim in the labeling. In any event, the law can be invoked only when the product has been transported across a State line."

"There is little doubt," continues Mr. Campbell, "that the cases of progressive blindness recently reported in California are the result of medication with dinitrophenol. It is to be regretted that the present Federal law is silent with respect to the control of dangerous drugs."

Of all the products containing dinitrophenol now on the market, only one has been confiscated under the Food and Drugs Act, the Administration reports. That was "Slim," against which

legal action was brought because of a label claim that it was "safe to use," whereas medical opinion is unanimous to the contrary. This proceeding was approved by Mr. Campbell, who states that in the absence of affirmative control over dangerous drugs, and to achieve one of the essential objects of the Food and Drugs Act—the protection of the public health—it is the purpose of the Administration to take advantage of any available legal technicality in proceeding against all products containing dinitrophenol. This, he points out, is contrary to the usual practice of the Administration in enforcing the Food and Drugs Act.

Dinitrophenol is sold under many fanciful names, sometimes accompanied by a statement of the presence of the drug itself. Some of the names under which it has been or is now being sold are reported by the Food and Drug Administration as follows: Nitromot, Dinitrolac, Nitra-Phen, Dinitris, Formula 281, Dinitrose, Nox-Ben-Ol, Re-Du, Aldinol, Dinitrenal, Prescription No. 17, Slim, Dinitrole, Tabolin and Redusols.

"It is interesting to note," said Mr. Campbell, "that all the so-called reducing preparations on the market fall into three categories: first, laxatives that deny the body the benefit of its food intake, as the salts, crystals and herb teas; second, obvious frauds that depend for effect upon the stringent diets prescribed as part of the 'treatment,' as 'Syl-Vetto' and 'Stardom's Hollywood Diet'; and third, the unquestionably effective but dangerous articles containing thyroid or dinitrophenol, both of which act by speeding up the utilization of food. All of them are unwarranted impositions upon the public, which cannot evaluate claims made for the preparations, and cannot readily appreciate the harm that may result from careless use of the products."

TWENTY FACTS RELATIVE TO MEDICAL FOUNDATIONS

The *Nassau Medical News* is authority for the following data pertaining to foundations:

1. That foundations having a combined endowment of more than $30,000,000.00 are definitely committed to the policy of forcing the establishment of compulsory health insurance under state and federal supervision.

2. That one of the most active of these foundations derives its funds from the profits of the Borden Company.

3. That another of the foundations the creation of Edward A. Filene, senior officer of the William Filene's Sons Co. of Boston, department store magnate, whose company owns or controls a chain of department stores which include Abraham and Strauss of Brooklyn and Bloomingdale's of New York.

4. That the health insurance legislation being sponsored by those groups in Washington, as well as in the state legislatures, would make compulsory the participation of fully 85 per cent. of the population of our cities, exempting only three groups: (1) farm laborers, (2) those employed in small jobs, having no more than two employees, and (3) "white collar" workers earning more than $60.00 per week.

5. That the entire organization and management of the health insurance machine is to be placed in the hands of political appointees.

6. That the director of this huge organization need not be a physician, and that there is no single office in the main administrative group which must be filled by a physician.

7. That the actual medical work is to be supervised by local, full-time politically appointed "medical managers," whose duties are comparable only to those of the foreman in an industrial plant and who have full charge of all medical matters, subject to the higher authority of the state board.

8. That this political lay-board holds the power of determining who may and who may not practice medicine among the insured group, and that to incur the displeasure of the machine means being permitted to practice only among the perhaps 15 per cent. of the population not insured.

9. That this political machine is even given power to borrow money against future revenues and to build hospitals, laboratories, clinics, "or other facilities" within their discretion.

10. That if a local office should make arrangements which are not satisfactory to the state board, the latter may come down to the local territory and take over the entire management itself.

11. That this supreme authority extends even to the matter of fees, so that Nassau County could still be classed as a "rural" community and its doctors be paid the same fees allowed those upstate.

12. That, as a matter of fact, there need not be any fees at all, but rather a fixed salary or an allowance of so much for each person on the doctor's panel.

13. That the scheme includes provisions for cash benefits for loss of time and for maternity benefits.

14. That the lessons learned by other countries where such plans have been tried are totally disregarded in this proposed legislation and that it embodies all of the very worst of these other experiments.

15. That the administrators, statisticians, investigators, supervisors, clerks and job holders would total more than the number of physicians engaged in caring for the sick.

16. That the wages of this parasitical group would add at least 50 per cent. to the cost of rendering the medical service.

17. That the doctors "on the inside," plus the army of lay-workers, would constitute a political machine which would hold the "balance of power" in any election and would therefore be self-perpetuating.

18. That the same abuses with which you are now familiar in workmen's compensation and medical care of the indigent must inevitably be present in this scheme, and would be multiplied beyond the power of imagination because almost the entire population would be included in the program.

19. That in no country where such a scheme has been tried has there been a reduction in sickness or death rates, but that, on the contrary, there has always been a definite increase in the time lost from industry because of sickness and a definite lowering of the standards of medical care.

20. That there is a very real danger of this effort at regimentation succeeding unless every doctor learns the truth and takes time to tell his patients.

SENATOR ALLEN ON STATE MEDICINE

The Medical Bulletin, Sedgwick County Medical Society, Kansas, is authority for the following abstract of an address by former Senator Henry J. Allen:

"The time is ripe for social workers, with the present trends in government administration, to advance with renewed impetus their contention that medicine should be socialized as one of the natural functions of the state." This warning was offered early in the address of Henry J. Allen, former governor and U. S. senator from Kansas, when he spoke to the members of the Sedgwick County Medical Society on June 18, the first of a series of monthly luncheon meetings being held during the summer.

Senator Allen, who, besides enjoying international renown as a statesman, is recognized as a keen student of sociology and economics, presented a clear and comprehensive discussion of the history of socialized medicine in Europe. More than half of the entire membership of the medical society was present at the luncheon meeting. The speaker was introduced by Dr. E. S. Edgerton, who prefaced the address with an account of present-day trends in medical economics in America.

The speaker described the results in Germany and England under socialized medicine which he had observed during his several trips abroad during recent years. Since 1883, when medicine was socialized in Germany with a system for compulsory health insurance, the doctor has been reduced to a state of pauperization. German doctors make an average of $800 per year and the only doctors who are affluent are those who specialize in diseases that the poor cannot afford.

Under the German system of compulsory health insurance, the employee contributes 18 cents per week, the employer 18 cents, and the state another 18 cents, into a fund for the state insurance. Senator Allen declared that Germany had discovered under state medicine that diseases have multiplied alarmingly because of constant malingering and the load has reacher proportions far above the anticipations of the original proponents. The public, he said, is the beneficiary of the system and would not want to abandon state medicine. The people have been taught to look to the state for medical care and protection against the other contingencies of life.

Senator Allen does not anticipate further radicalism in Germany. Germany is now completely socialized and will save the government from further immoderation of more severe socialization. Hitler is sufficiently radical to make improbable a more dangerous swing toward Fascism.

England felt the wave of socialization from Germany in 1911 when she adopted the German system for old age pensions, unemployment insurance and compulsory health insurance for those under $1,200 annual income. The German precedent was less broad in that it was restricted

to those having an annual income of $500 or less. The cost of health insurance in England was about the same, requiring about 18 cents per week each from the employer, employee and state.

The United States are now feeling the wave of socialization from England just as she felt it from Germany. Under her system of socialized government, England is spending about $1.15 per citizen annually. Last year the U. S. spent 16% more per citizen than did our mother country. Doctors in England are now receiving an annual income of about $1,000. Those who receive more are specialists who treat the wealthy.

Optimism was expressed in the statement of Senator Allen that "The keen ability of the profession in this country should be sufficient to save this country from the disaster that has befallen it in England, Germany, Austria, Poland, Italy, and other countries of Western Europe where medicine is practiced under the direction and payroll of the state."

The danger in America is imminent. One-fifth of the people are now beneficiaries of the U. S. Government. Sentimentalism will be used to extend the social phases of government to make the practice of medicine a function of the state.

Danger signals of threats to medical practice in the U. S. were pointed out by the speaker. He said: "The medical profession in the U. S. must lead the way to a middle ground. I can't help but believe that the profession will be able to work out a modified answer. But medicine cannot hope to be left untouched; some change will have to be made. There is no field of human activity in the U. S. that is so challenged to change as the practice of medicine.

"The great thing we call private practice has reached a plane in the U. S. that is worth saving. But the problems facing the medical profession will not solve themselves. An intelligent solution must come from within the profession.

WHAT THE UNITED STATES CONSTITUTION MEANS

The *Sentinels of the Republic*, a non-partisan organization, proposes to tell—

The Homeowner: That it is the Constitution —*not the Congress or the Executive*—which protects him in the ownership and the sanctity of his home.

The Wage-earner: That it is the Constitution —*not the Congress*—which safeguards his independence of action and the fruits of his toil.

The Business Man: That it is the Constitution —*not the Congress*—which maintains the sanctity of contracts and his freedom to manage his own affairs.

The Professional Man: That it is the Constitution—*not the Congress*—which guarantees him both the opportunity and the compensation for his enterprise.

The Young: That it is the Constitution—*not the Congress*—which offers them freedom to rise to whatever heights their ability may carry them.

The Mature: That it is the Constitution—*not the Congress*—which assures stability in government and in the affairs of life.

All Citizens: That it is the Constitution—*not the Congress*—which assures them personal security, an equal voice in government, freedom of speech, freedom of religion, and the other rights demanded by self-reliant, self-respecting Americans.

STARTLING RESULTS REVEALED BY RECHECK OF PATIENTS IN THE GERMAN SICKNESS INSURANCE SETUP

Medical Times is authority for the following menacing feature of sickness insurance in Germany. We quote:

"Patients are visited in their homes by controlling officials who have to convince themselves that the patient is really ill and not doing any work. The sick insurance engages so-called confidential doctors who have to submit the patient to a final examination to see whether he is too ill to work. The results of such examinations are to a great extent startling. Here is one instance from among thousands: 2,008 patients were ordered to appear for a final examination. Eight hundred sixteen of them at once declared their complete recovery; 289 were found to be well by the confidential doctor. So nearly half of them were not ill at all.

"The confidential doctor is, so to say, the medical policeman who not only controls the patients but also his fellow doctors who are treating them.

"The genuine patient is justly indignant to find that the existence of his illness is doubted, and that he who has always paid his premiums regularly and has a right to demand conscientious attendance, is considered a cheat."

AND IT GOES DOUBLE FOR ANY ATTEMPT TO SOCIALIZE MEDICINE

Dr. Alfred P. Sloan, Jr., commenting on the Supreme Court decision anent the NRA, said, among other things: "Sooner or later we are bound to recognize that regimentation and bureaucracy have no part in our national economy. They can only produce one result—lowered efficiency, increased costs, and reduced standard of living." And that goes double for any attempt to socialize medicine or to regiment the profession in a compulsory health insurance scheme.

Senator William E. Borah says:

"With bureaus or departments, the appetite increases with what it feeds upon. It is well to remember that the taxpayer is the same for the state taxes as for the Federal Government. It makes little difference whether one government, the state or the federal, imposes the tax. There is only one people to take care of both taxes. We should not expend a dollar, nor impose a single item of expense upon the people of this country until relief from taxes is in sight."

Attorney General Crim says: "The Department of Justice is staggering under the load imposed by sumptuary and police laws—laws that within all common sense fall within the natural sphere of local governments. Unless there is a halt in this tendency to saddle all responsibilities on the Federal Government, the time will come when we will have in Washington a bureaucracy knowing no master—and one day the country will be in ruins."

Charles Evans Hughes, when he was Secretary of State, told the members of the American Law Institute in convention at Washington:

"We have in this country the greatest law factory the world has ever known. Forty-eight states and the Federal Government are turning out each year thousands of new laws while at the same time the courts in the performance of judicial duty are giving us thousands of precedents—175,000 pages of decisions in a single year, an average of 12,000 or more statutes every year, and an annual average of 13,000 or more permanently recorded decisions of highest courts."

The danger which every republic should fear is over-centralization, with the subsequent substitution of domination by one man for the rule of the people. Germany is the historic symbol of absolutism. We have recently concluded a war, undertaken, we are told, that democracy might not perish from the earth. If this is true, to attempt to centralize in Washington the management of affairs that belong rightfully to the respective states is to create a system that cannot but destroy democracy among our people by betrayal of principles which are the fundamentals for the maintenance of government.

The centralization of power, whether in industry, commerce, education or the trades or professions or other factors entering into affairs of our everyday life amounts to this: that if we grant to an individual the power to make standard or be the sole authority to revise, abolish, or fix conditions under which the people of the future have to live, work and be educated, we set up an oligarchy which will create and foster bolshevism.

THE ENGLISH WORKMEN'S COMPENSATION ACTS PROLONG DISABILITY

The A. M. A. regular London correspondent under date of March 16, 1935, says:

The report of a committee appointed by the British Medical Association to consider the treatment of fractures has been reviewed in a previous letter. An appendix on "Nonmedical Factors of Prolonged Disability" was not included and, because of its importance, requires a special notice. While disclaiming that a purely medical committee can have an intimate acquaintance with all aspects of the fracture problem, the committee felt that some reference was necessary to the nonmedical factors that militate against return to work. The committee points out that the workmen's compensation acts in many cases play a powerful part in prolonging disability and delaying return to work and on occasion in converting the workman into a permanent invalid. The committee freely admits that the acts are humane and beneficial. That legislation in other countries has been based on them shows that the ideas conceived in this country are sound. But the acts contain no provision for the rehabilitation of the man after injury and place no liability on him to prove that he has sought and obtained efficient treatment, while the type of monetary benefits granted under the acts are often positively harmful to the man. Three methods are adopted by employers for insuring against the liabilities imposed on them by the workmen's compensation acts: (1) through insurance companies, (2) by

mutual associations of groups of employers, and (3) by individual employers. Under the first method the insurance company is not concerned with the man's recovery as such but with the settlement of his claim as speedily as possible. Measures such as those recommended by the committee to reduce the period of incapacity in general will not necessarily be welcomed by the companies, as they must eventually involve a reduction of revenue through lowering of premiums. On the other hand, the second and third methods have not this advantage. The economic advantage of the insurers is implicit in the recovery and ultimate welfare of the disabled man. For this reason mutual associations and self-insured employers often find it advisable to employ their own medical officers to supervise the injured workman. An admirable scheme, recognized under the compensation acts, is under the control of a board composed partly of employers and partly of workmen. It allows for the provision of unbiased medical referees whose opinion is final and is accepted without litigation by all parties. It also arranges for lump sum payments and pensions.

THE U. S. DEPARTMENT OF AGRICULTURE EXPANDS TO STUDY VITAMINS AND PHARMACOLOGY

Under date of July 13 the Department of Agriculture released the following data:

Two Doctors Nelson have been appointed as chiefs of the new divisions of the Food and Drug Administration, Dr. E. M. Nelson as chief of the Vitamin Division and Dr. Erwin E. Nelson as chief of the Pharmacological Division. The Department of Agriculture announced today that each is now assembling a staff taken in part from older units of the Department and in part recruited from specialists in the sciences involved in the work of the new divisions.

In announcing the creation of the new divisions W. G. Campbell, Chief of the Food and Drug Administration, emphasized the increasing importance of work in each of these fields and said that the work is so essential that it must be pushed, even though for the time being the required funds may have to be deducted from support of regulatory work. The Vitamin Division will check the claims and help establish standards for food and drugs for which claims of vitamin potency are made. The Food and Drug Administration has been doing some routine work of this sort, but it has been inadequate to meet the growing need.

The Pharmacological Division, in addition to more comprehensive testing of certain medicinal products, will pay particular attention to several relatively new fields of work—the testing and standardization of glandular preparations put on the market in recent years, investigations of the effect of poisons and impurities present in foods, and testing of the effects of new synthetic chemicals used in foods and medicines.

CLASS IN VITAMINS ORDERED BY WISCONSIN LEGISLATURE

A bill requiring that instruction in the vitamin content, food and health values of dairy foods be offered 15 minutes per week in grade schools and high schools throughout the state has been signed by Lieutenant-Governor O'Malley. The bill, introduced by Sen. Earl Leverich, Sparta, directs the schools to include this study in their curriculum and requires the University of Wisconsin to co-operate in the program.

SEEKING A PROPER CLASSIFICATION FOR VITAMINS

The A. M. A. regular London correspondent under date of June 15, 1935, under the heading "Vitamins and the British Pharmacopeia," says:

The pharmacopeia commission, which was appointed in 1933 for three years to collect material for the next edition, has reported that it has been actively engaged in preparing an addendum to the British pharmacopeia, publication of which is expected next year. The commission has formed a committee of experts to deal with the vitamins and their preparations. At a meeting of the General Medical Council, which received this report, Dr. H. G. Dain, chairman of the Insurance Acts Committee of the British Medical Association, said that he found difficulty in drawing a line between food and drugs, since the products that contained vitamins would in the ordinary way be foods. He thought that the public and the profession should be taught that vitamins could not be regarded as drugs, and that the government should take steps to see that common foods contained the vitamins that properly belonged to them. Sir Henry Dale replied that, although much vitamin research lay on the border line between therapeutics and nutrition,

the pharmacopeia did not aim at establishing standards of normal diet. Some vitamins had now been isolated in a chemically pure form. Apart from the need of them in normal diet, many patients would require vitamins to be given in the most concentrated form. It was the duty of the pharmacopeia to see that such potent remedies were standardized apart from any question of general policy.

THE EFFECT OF VITAMIN B ON FEMALE GENITAL ORGANS

J. Ueno, *Japanese Journal of Obstetrics and Gynecology,* 17: 388, 1934, says that in the deficiency disease of vitamin B the conceptive ability is depressed and some animals finally fall into sterility. But before the deficiency of the vitamin becomes intense, conception is possible, though various abnormal processes take place during the course of pregnancy, parturition and puerperium; for instance, anomalous hemorrhage of the pregnant uterus, intra-uterine absorption of fetuses, early interruption of pregnancy, weakened power of expulsion, and disturbance in the uterine involution. During the attack of the disease, the development of the fetuses is markedly hindered. In extreme cases some fetuses have been absorbed or macerated in the uterus and others have been delivered in stillbirth. Even if born alive, they are generally structurally weak and small in body length, and among the fetuses born from the same mothers some variance was revealed in their body weight and length.

Experimental Study on Effects of Vitamin B on Female Genital Organs: Part IV. Effects of Some Endocrines to Ovarian Hypofunction Due to Deficiency of Vitamin B: Part V. Effects of Deficiency Disease of Vitamin B on the Conceptive Ability, Pregnancy, Parturition and Puerperium.

DIAGNOSIS OF VITAMIN C SUBNUTRITION BY URINALYSIS

L. J. Harris and N. S. Ray, *Lancet,* London *1*: 71, 1935, observed that infants suffering from manifest scurvy or with a history of vitamin C underfeeding excrete less vitamin C in their urine (measured chemically) than do well nourished infants of the same age tested under the same conditions (on controlled diets low in vitamin C). The difference can be made more strikingly manifest by the administration of a large test dose of vitamin C: a marked peak results in the curve of the urinary excretion for the normal infants, but not for the "unsaturated," scorbutic or semiscorbutic infants. After cure the scorbutic infant behaves like a normal infant both in his output of vitamin C on ordinary diets (or controlled diets free from vitamin C) and in his response after the test dose. Observations on adults show that a low urinary output and a low response to test doses go parallel with a history of vitamin C underfeeding and with a state of vitamin C subnutrition as indicated by a lowered capillary resistance. The authors describe a technic that is being used to estimate the prevalence of hypovitaminosis C among certain sections of the community. The rarity of scurvy in breast-fed infants is explained by the finding that human milk contains from three to four times the amount of vitamin C found in cow's milk; part of the latter is also lost generally (1) by pasteurization, (2) during standing, (3) by further heating and (4) by dilution.

Diagnosis of Vitamin C Subnutrition by Urine Analysis: Note on Antiscorbutic Value of Human Milk. L. J. Harris and S. N. Ray.

RELATION OF VITAMIN B DEFICIENCY TO METABOLIC DISTURBANCES DURING PREGNANCY AND LACTATION

Doctors E. M. Tarr and Olga McNeile, Los Angeles, in American Journal of Gynecology, 29: 811, 1935, contend that a deficiency of vitamin B in the diet of pregnant and lactating women usually produces definite symptoms. Signs of demineralization are more pronounced in those women who obtain less than 50 per cent. of their total calories from protective foods. It was observed that test cases showed a much better blood picture than was true with the controls. Of the control group 4.5 per cent. were threatened with miscarriage. The test group escaped all such symptoms. More calm and better milk producers were found in the test group. Severe signs of gastric and intestinal atony were almost entirely absent in the test group, whereas these signs were encountered in more than 20 per cent. of the control group. Undoubtedly this was not purely coincidental. Previous views concerning some of the signs of vitamin B deficiency during pregnancy and lactation have been substantiated.

ECONOMY

She: "What are all those men doing in a circle with their heads together? Is it a football team?"

He: "No, my dear, just a bunch of Scotchmen lighting a cigarette."

INTRASPINAL (SUBARACHNOID) INJECTION OF ALCOHOL FOR PAIN ASSOCIATED WITH MALIGNANT CONDITIONS OF THE FEMALE GENITALIA

J. P. Greenhill and Herbert E. Schmitz, Chicago (*Journal A. M. A.*, Aug. 10, 1935), experimented with twenty-seven subarachnoid injections of alcohol in twenty-five women with advanced carcinoma of the genitalia. The authors recommend this procedure in all women who suffer from excruciating and persistent pain that is associated with genital carcinoma. This injection is simple to carry out, it entails very few risks, and it has brought relief to twenty-four out of twenty-five patients. Because it is simpler than any operative procedure and because the results are so satisfactory it is now being used in preference to pelvic sympathectomy, which was advocated two years ago for the same purpose. The authors will resort to sympathectomy in the cases in which alcohol injections fail. Until more is known about the late effects of 95 per cent alcohol on the spinal cord itself, it is best to restrict subarachnoid injections to patients in whom the malignant condition is far advanced.

SOME ROENTENOLOGIC STUDIES OF DYNAMICS OF THORAX

J. W. Pierson, Baltimore (*Journal A. M. A.*, Aug. 10, 1935), refers to three cases, of which one presented congenital absence of one lung and two complete traumatic atelectasis of an entire lung. The two outstanding features of these cases were the great size attained by the right lung and the ease with which it traversed the mediastinum. This was demonstrated at operation and later by bronchography. The cases of traumatic atelectasis of one lung are examples of true herniation of the lung and are not to be confused with the herniations that are sometimes produced in cases of therapeutic pneumothorax. The physical effects in the latter group are the result of high positive pressure on the side on which the pneumothorax has been induced. Consideration of the author's and of Rienhoff's cases shows that the same compensatory mechanism functions in the presence of diminished lung size, no matter what the primary cause. Several essentials are necessary in order to permit of the proper functioning of the processes of restitution. First, the lung must be capable of expansion. Certainly an overexpanded emphysematous lung is not able to respond to the influence of a negative intrathoracic pressure as readily as a lung in which the normal elasticity has been preserved. Second, the mediastinum must be patent. This factor is governed very largely, though not wholly, by the age of the patient. The reason for this is quite obvious, because advancing age causes fixation of the mediastinal structures. Infection in operative cases plays an important role in a negative sense. If present it also causes fixation of the mediastinum and it renders the permanent closure of the bronchus more difficult. The results obtained in the operative cases would seem to justify the technic, which is designed to utilize the compensatory mechanism of the thorax. Furthermore, preservation of the thoracic cage provides protection for underlying structures, aids in early restoration of the normal physiologic functioning of the thorax, and avoids the necessity of a deforming operation.

FACIAL ERYSIPELAS: EVALUATION AND COMPARISON OF SPECIFIC ANTISERUM AND ULTRAVIOLET THERAPY

H. Jerry Lavender and Leon Goldman, Cincinnati (*Journal A. M. A.*, Aug. 10, 1935), observed ninety cases of adult facial erysipelas from 1933 through the spring of 1935. Thirty-two of these cases were treated with specific antiserums with an average of 4.8 injections. Twenty-six patients were given intensive ultraviolet therapy with an average of 18.8 erythema doses at a treatment and an average of three treatments for each patient. Thirty-two cases were used as controls with simple wet dressings. The seasonal incidence, the lapse of time before the onset of treatment, the general condition or debilitation of the patient and previous treatment are a few of the matters that play a marked role in the evaluation of the therapy instituted. Ultraviolet therapy is equal if not superior to serum therapy. The end results, governed by the quickker response to treatment and the fewer complications, make ultraviolet therapy for facial erysipelas distinctive and the method of choice.

"FRIENDSHIP"

Friendship—Aristotle defines: As one soul abiding in two bodies—and the world has not changed very greatly since his time; all of the fruits of friendship spring from the roots of influence—and influence in the main is the impress of our real character on the lives of others.

The influence of a doctor—not only among his colleagues and patients; but generally among his fellow men is more far reaching than most of us know.

Let us not become careless or neglectful of our opportunities.

HEMATURIA AS A COMPLICATION OF PREGNANCY

Harold L. Morris, Detroit (*Journal A. M. A.*, Aug. 10, 1935), found that in a routine study of 154 urologic consultations because of urinary tract disturbance during pregnancy, hematuria occurred in thirty cases. Further study of these thirty patients revealed cystitis in all cases; pyelitis in twenty-two, of which twenty were bilateral and two were unilateral; hydronephrosis in ten, two of which were bilateral and eight unilateral; pyonephrosis of the right kidney in two cases, and ptosis in nine cases, four being bilateral, four right and one left. Megaloureter occurred in eleven cases, of which four were bilateral, six right and one left. Ureteral calculus of the right ureter was present in two cases, and ureteritis in two cases, one bilateral and one of the right ureter. Hematuria is a grave complication of pregnancy, and in all instances of hematuria occurring during pregnancy the very least the patient is entitled to is a thorough investigation by a competent urologist.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Illinois State Medical Society
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With the adjournment of Congress, without any legislation affecting the medical profession directly, we should not be lulled into a feeling of false security. The Social Security measure just passed was merely the opening wedge of proposed legislation involving the care of the unfortunate groups which have looked with increasing longing at the federal government the past two years for aid and assistance. In this longing, they have been encouraged by the uplifters, who realize that there is no better method of building up efficient political machines than by making a group or groups dependent upon the government and its representatives for their daily necessities of life. And included in this list of necessities of life, according to their opinion, medical care comes high in its position.

Should anyone question the ultimate desire of the reformers, he need only to read the current magazines and find the increasing volume of articles, some written by out and out propagandists for reform as well as others written in more subtle form by alleged unbiased observers. A recent article on the Editorial Page of *Colliers* came to our attention. Let me quote a few sentences from the article. "The Social Security Measure went through Congress not as a partisan measure. No important opposition appeared." "This Committee (the Committee on Social Security, appointed by the President) employed experts and made a thoughtful investigation into the broad subject of insecurity in our economic life." "The actual Social Security measure is not extravagant, but it does mark an immense step forward." "No one, least of all its advocates, imagine that the Social Security measure is a complete answer to economic security. It is, however, a brave and reasonable step in advance. On the foundations of actual experience, better systems can be devised." Appearing in such an influential periodical as *Colliers*, this editorial will have great influence. To one who reads it analytically there is both the desire for further reforms as well as the promise that this is but the beginning of further legislation in the future. Unquestionably some of their statements are debatable, and it is unfortunate that such propaganda is being pushed by them. Surely we must have no illusions as to the necessity of continued vigilance and opposition to these changes by organized medicine.

The Committee on Medical Economics of the Illinois State Medical Society expects to hold a meeting early in September to outline the exact nature of the work of the year. There is no question but there is an ever increasing interest on this subject by the medical profession of the state. This is evidenced by the increased request for speakers on medical economic subjects. We hope to have such speakers available in all parts of the state during this coming year and trust that every County Society will include in their program a talk on this subject. Miss McArthur of the Educational Committee will have a list of available speakers as soon as the same is completed and she will be glad to assist in any way. Also we hope she will be able to furnish speakers for lay groups, which are interested in the subject and a live physician in every community can arrange for several talks before groups in his community. This is the greatest opportunity we have to spread information favorable to the medical profession and no chance should be lost. But three or four men cannot do it. It is work for every member of the society and will pay great dividends in years to come.

This month the chief article of this column is by the Chairman of the Council of the Illinois State Medical Society, Dr. I. H. Neece of Decatur. His record of accomplishments for organized medicine the past twelve years he has served as Councilor from his district needs no comment. His opinions and ideas are worthy of attention. We hope that you will read the article and thereby get a better view of the magnitude of the work before us.

We hope to continue the plan of having articles by some member of this committee or an officer of the society each month, in an effort to get the different ideas of the many presented in a way that the Chairman of the Committee is unable to do.

Continue to write in your question on economic problems and we will refer them to the proper individual for authentic replies.

E. S. HAMILTON, M. D.,
Chairman of the Committee on Medical Economics.

CHANGING MEDICAL TRENDS

The structure of social relationships is in a state of revolution. Economic depression has produced innumerable forces that seek change in the existing order of things. No business or profession has escaped the effects of this revolution. Medicine in particular is being stirred in this cauldron of witches. What the potion shall be is to be determined by whatever leadership gains the ascendency as well as by the fundamental structure of the art itself. That grave forces are at large, both without and within organized medicine, endeavoring to change not only the structure of social activity in man's state of health, but also in his ill health, is evident. Whatever plan is finally adopted concerning how a physician shall practice medicine will determine the usefulness of the doctor of the future.

That we, the organized unit of medicine in Illinois, should have some part in determining this final plan for the practice of medicine is absolutely necessary. That other forces or leadership are attempting to change the order and manner of our practice cannot now be disputed. Whether we accept this lay leadership in telling us how and for what, when and on whom we shall ply the art of our science rests with the membership of the Illinois State Medical Society in so far as the commonwealth of Illinois is concerned. That sinister forces are active in our national and state governments which have for their purpose, it seems to me, a limitation of the present status of the members of our profession there can be no doubt. These forces profess interest in our patients, indict us for our inability to meet what they say is the problem of public and private health. Vast sums of money endorse these critics and on that account they are permitted to make their charges that the doctor's fee is too much and that the doctor does not meet his responsibility to his patient. In fact, indirectly, they infer we do not know our business in taking care of the sick. They charge, properly, that it costs too much to be sick. To that part of their doctrine we all heartily subscribe. But they imply that if the doctor of tomorrow was paid less the cost of sickness would be in great part relieved. They can cite a few instances when despicable overcharges have been made by doctors. So they indirectly deduce that all doctors overcharge for their services. Hence, all men who practice medicine should be thwarted by law to become social service hirelings of the state and subject to the dictates of the executive of the state or nation for a compensation the layman shall dictate. In fact, these forces want to socialize the doctor although loud in their cry against socialization of business. They appear to be advocates of communism for the doctors but not for themselves. On this basis we indict the logic of their position and the sincerity of their purpose.

To meet the necessary high cost of sickness we now have insurance plans being formulated. For a small yearly premium the patient is to receive care for his existing sickness. The insurer contracts to furnish a doctor and a hospital bed but no nurse. The doctor will become the insurance employee. Whatever profit shall evolve shall compensate the director of the insurance company who argues that he takes the risk and therefore the gain. The main fault with the plan is that the doctor is not paid a salary commensurate with the duty he is supposed to perform. Hence, the doctor who has the ability to properly service the insuree's necessity is not economically available. Often, a less capable physician is employed. This is fundamentally and ethically wrong. We subscribe to the fundamental principle that the sick man shall have the privilege of the employment of the very best doctor for the purpose of healing his illness. That the patient does not always do so does not invalidate the logic of this established principle. We believe such insurance plans as are now available to meet the poor man's sick problem are thus opposed to the best interest of the patient as well as the doctor.

So much for the proposed plans to take the care of the sick out of the hands of the trained physician. If we are sure of our position we

need fear no such mechanisms. We can so oppose their proponents that they cannot succeed in their establishment. We should always do so on the basis of the best interest of the patient. This is the position we must steadfastly hold.

Among the other problems which the practicing physicians must confront is the free clinic service, which has quadrupled in a decade. Physicians of medicine now treat gratis 500,000 of the Nation's daily sick list of 1,250,000.

Pay clinics have had a recent mushroom growth. They were designed for downtrodden white-collar workers and to operate on a system of small fees. Doctors are expected to give their services free while other employees are paid.

Competitors have been chiseling fat slices from the national medical dollar: Osteopaths, $42,000,000 a year; chiropractics, $63,000,000, and livings for 3,000 naturopaths and 10,000 Christian Science practitioners.

There never was any excuse for the chiropractor or the oseteopath and they never should have been allowed by the medical profession to assume the proportions they have attained or to have become powerful enough to have or attempt to have separate boards of licensure. Illinois, thanks to the efficient Legislative Committee, has come through with another 100 per cent. record. The medical profession should have absorbed the best these cults had and taught and used it. They should not, even now, be allowed to usurp the medical doctors' sphere by prescribing drugs as a great majority do. Possibly, had the medical profession been alive to its own interests, the various types of healing such as osteopathy, chiropractic and naturopaths would never have had the following they now command.

Lesser bad breaks for the family doctor's pocketbook have included free hospitalization of veterans and mass production contract systems of medicine fostered by insurance companies and compensation clinic work.

I am told that now highway filling stations are being recommended as first aid emergency stations.

In spite of shrinking incomes among its members, the profession has officially denied that the system of private practice is threatened. Socialization of medicine, which might insure practitioners bread and butter in the form of salaries, will ultimately undermine medical ethics.

There has never been a time when the human race, the nations of the world and our profession in particular needed intelligent, careful, thoughtful common sense leadership as it does today. Therein lies a challenge to all of us, to bring forth the best, the most substantial traits which we possess and apply them to our future problems which are just being opened up by our present situation.

I. H. Neece, M. D.,
Chairman of Council.

Correspondence

"THE DOCTOR'S BILL," BY HUGH CABOT

Chicago, July 15, 1935.

To *The Editor:* In this book of three hundred pages Dr. Cabot has, on the whole, presented the many aspects of the current medical situation quite simply and sanely. The book is evidently intended for popular reading and probably on this account is more cursory and discursive than the author feels. From his position with the Mayo Clinic, Dr. Cabot's bias for Rex Brown and the Group practice of the Majority Report is understandable as a personal reaction.

He remarks somewhere "that he cannot conceive how physicians can estimate the extent of sickness among patients whom they do not see." It is more likely that the great majority of sick people outside of the Cults get to the doctor than that any who are really ill are neglected. No one knows better than Dr. Cabot than in a large percentage of cases persons may feel either sick or well and yet be quite the contrary in reality, and in these cases it is *only* the doctor who can differentiate them.

The accusation that great numbers of people suffer from lack of medical care is made by Social Theorists and Salaried Altruists for selfish motives and in Illinois at least and in the United States generally, according to accepted statistics, the statement is not substantiated.

Charles B. Reed, M. D.

NEW MATERIAL PLANNED FOR COUNTY MEDICAL SOCIETIES

The Scientific Service Committee reports a very satisfying and encouraging response to a notice recently sent to physicians who had previously consented to address scientific groups and county medical societies.

No doubt there are other members of the

Illinois State Medical Society, not receiving this letter, who will wish to take part in these programs. They will please so advise the Chairman of the Committee, listing the topic or topics on which they are prepared to talk.

ROBERT S. BERGHOFF, M. D., Chairman,
30 North Michigan Avenue, Chicago.

INTER-STATE POSTGRADUATE MEDICAL ASSOCIATION OF NORTH AMERICA

The International Assembly of the Inter-State Postgraduate Medical Association of North America will be held in the beautiful Masonic Temple, Detroit, Michigan, October 14, 15, 16, 17 and 18, 1935, with pre-assembly clinics on Saturday, October 12 and post-assembly clinics Saturday, October 19, in the Detroit Hospitals.

The Association through its officers and members of the program committee extends a very cordial invitation to all physicians in good standing in their State and Provincial Medical Societies to attend the Assembly. An unusual clinical and didactic program including all branches of medicine and surgery and the specialties has been arranged by the program committee.

In cooperation with the Wayne County Medical Society and the Michigan State Medical Society and with the active support of the Detroit Convention and Tourist Bureau and the Detroit Board of Commerce, a most excellent opportunity for an intensive week of postgraduate medical instruction is offered by a very large group of acknowledged leaders in the profession.

With a great deal of pride and satisfaction, we call your attention to the list of distinguished teachers and clinicians who will take part on the program which appears on page 15 of the advertising section of this journal.

Registration fee of $5.00 admits all members of the profession in good standing.

Dr. Charles H. Mayo, President, Rochester, Minn.

Dr. George Crile, Chairman, Program Committee, Cleveland, Ohio.

Dr William B. Peck, Managing-Director, Freeport, Ill.

INTERNATIONAL ASSEMBLY OF THE INTER-STATE POSTGRADUATE MEDICAL ASSOCIATION OF NORTH AMERICA

DETROIT, MICHIGAN

OCTOBER 14, 15, 16, 17 AND 18, 1935

Monday, October 14

8 A. M.

Diagnostic Clinic: "Anemia." Dr. Cyrus C. Sturgis, Professor of Internal Medicine, University of Michigan Medical School, Ann Arbor, Michigan.

Diagnostic Clinic: "Peptic Ulcer." Dr. Donald C. Balfour, Professor of Surgery, University of Minnesota Graduate School of Medicine, Rochester, Minn.

Diagnostic Clinic: "Types of Oedema and their Treatment." Dr. Henry A. Christian, Hersey Professor of the Theory and Practice of Physics, Harvard University Medical School, Boston, Mass.

Intermission for Review of Exhibits

Diagnostic Clinic: "Factors Influencing the Healing of Fractures." Dr. William Darrach, Dean Emeritus and Professor of Clinical Surgery, Columbia University College of Physicians and Surgeons, New York, N. Y.

Address: "Pneumonias of Childhood." Dr. Charles H. Smith, Professor of Pediatrics, University and Bellevue Hospital Medical College, New York, N. Y.

Noon Intermission

Diagnostic Clinic: "Headache." Dr. Elliott C. Cutler, Moseley Professor of Surgery, Harvard University Medical School, Boston, Mass.

Address: "Plastic Operations on the Lower Urinary Tract for Congenital Deformities." Dr. Hugh H. Young, Professor of Urology, Johns Hopkins University School of Medicine and Director of the Brady Urological Institute, Johns Hopkins Hospital, Baltimore, Md.

Address: "Lead Poisoning in Children." Dr. Harold B. Cushing, Clinical Professor of Pediatrics, McGill University Faculty of Medicine, Montreal, Canada.

Intermission for Review of Exhibits

Address: "Hyperplastic Tuberculosis of the Large Bowel, Its Diagnosis, Treatment and Prognosis." Dr. Fred W. Rankin, Lexington, Ky.

Address: "Diagnosis and Treatment of Diseases of the Esophagus." Dr. Gabriel Tucker, Professor of Bronchoscopy and Laryngological Surgery, University of Pennsylvania Graduate School of Medicine, Philadelphia, Pa.

Address: "Indications for and Advantages of Vaginal Hysterectomy." Dr. Alexander W. Blain, Professor of Surgery, Wayne University College of Medicine, Detroit, Mich.

Dinner Intermission

Address: "Thoracic Surgery." Dr. George J. Heuer, Professor of Surgery, Cornell University Medical College, New York, N. Y.

Address: "A Critical Estimate of the Value of

Laboratory Procedures in Disorders of Metabolism." Dr. John P. Peters, John Slade Ely Professor of Medicine, Yale University School of Medicine, New Haven, Conn.

Address: "Tendon Transplantation in the Lower Extremity." Dr. Frank R. Ober, Assistant Dean, Harvard Medical School, Course for Graduates; Clinical Professor Orthopedic Surgery, Harvard University Medical School, Boston, Mass.

Address: "Hyperthyroidism in Patients Over Fifty Years of Age." Dr. Charles A. Elliott, Professor of Medicine, Northwestern University Medical School, Chicago, Ill.

Tuesday, October 15

8 A. M.

Diagnostic Clinic: "Tuberculosis." Dr. James A. Miller, Professor of Clinical Medicine, Columbia University College of Physicians and Surgeons, New York, N. Y.

Diagnostic Clinic: "The Prostate Gland." Dr. William E. Lower, Cleveland Clinic, Cleveland, O.

Diagnostic Clinic: "Chronic Arthritis." Dr. Russell L. Cecil, Professor of Clinical Medicine, Cornell University Medical College; Professor of Internal Medicine, New York Polyclinic Medical School and Hospital, New York, N. Y.

Intermission for Review of Exhibits

Diagnostic Clinic: "Diverticulitis and Diverticulosis." Dr. John F. Erdmann, Attending Surgeon of the New York Post Graduate Hospital and Medical School, New York, N. Y.

Address: "The Present Status of Bronchoscopy in Bronchial Asthma." Dr. Louis H. Clerf, Professor of Bronchoscopy and Esophagoscopy, Jefferson Medical College, Philadelphia, Pa.

Noon Intermission

Diagnostic Clinic: "Diseases of the Skin in Infancy and Childhood." Dr. Howard Fox, Professor of Dermatology and Syphilology, University and Bellevue Hospital Medical College, New York, N. Y.

Address: "Diphtheria Prevention, Methods and Results." Dr. John G. Fitzgerald, Dean and Professor of Hygiene and Preventive Medicine, University of Toronto Faculty of Medicine, Toronto, Canada.

Address: "Empyema." Dr. Charles R. Austrian, Associate Professor of Medicine, Johns Hopkins University School of Medicine, Baltimore, Md.

Intermission for Review of Exhibits

Address: "Diagnosis and Treatment of Surgical Lesions of the Spinal Cord." Dr. Alfred W. Adson, Professor of Neurosurgery, University of Minnesota Graduate School of Medicine, Rochester, Minn.

Address: "The Differential Diagnosis of the Major Psychoses." Dr. Clarence B. Farrar, Professor of Psychiatry, University of Toronto Faculty of Medicine, Toronto, Canada.

Address: "Interrelationship of Mother and Fetus." Dr. Fred L. Adair, Professor of Obstetrics and Gynecology, The School of Medicine of the Division of Biological Sciences, University of Chicago, Chicago, Ill.

Dinner Intermission

7 P. M.

Address: "The Surgical Treatment of Cranio-Cerebral Injuries." Dr. Loyal Davis, Professor of Surgery, Northwestern University Medical School, Chicago, Ill.

Address: "Conceptions of Diabetes as Modified by Recent Studies of the Hypophysis and the Adrenals." Dr. David P. Barr, Busch Professor of Medicine, Washington University School of Medicine, St. Louis, Mo.

Address: "The Water Balance of the Surgical Patient." Dr. Frederick A. Coller, Professor of Surgery, University of Michigan Medical School, Ann Arbor, Mich.

Address: "The Importance of Dietetics in Modern Medicine." Dr. Robert W. Keeton, Professor of Medicine and Head of the Department, University of Illinois College of Medicine, Chicago, Ill.

Wednesday, October 16

8 A. M.

Diagnostic Clinic: "Deficiency Diseases of Children." Dr. Alan G. Brown, Associate Professor of Medicine (Pediatrics), University of Toronto Faculty of Medicine, Toronto, Canada.

Diagnostic Clinic: "Infections of the Urinary Tract." Dr. Hugh Cabot, Professor of Surgery, University of Minnesota Graduate School of Medicine and Consulting Surgeon at the Mayo Clinic, Rochester, Minn.

Diagnostic Clinic: "The Gallbladder." Dr. David Riesman, Professor of Clinical Medicine, University of Pennsylvania School of Medicine, Philadelphia, Pa.

Intermission for Review of Exhibits

Diagnostic Clinic: "Complications of Late Pregnancy." Dr. John R. Fraser, Professor of Obstetrics and Gynecology, McGill University Faculty of Medicine, Montreal, Canada.

Address: "The Present Status of Our Knowledge of the Suprarenal Cortical Hormone." Dr. George A. Harrop, Associate Professor of Medicine, Johns Hopkins University School of Medicine, Baltimore, Md.

Noon Intermission

Diagnostic Clinic: "Benign Tumors of the Breast." Dr. Edward J. Klopp, Professor of Surgery, Jefferson Medical College, Philadelphia, Pa.

Address: "Influence of the Anesthetic on the Risk of Operation." Dr. George P. Muller, Professor of Clinical Surgery, University of Pennsylvania Graduate School of Medicine, Philadelphia, Pa.

Address: "Fracture of the Neck of the Femur." Dr. Dallas B. Phemister, Professor of Surgery, The School of Medicine of the Division of the Biological Sciences, University of Chicago, Chicago, Ill.

Intermission for Review of Exhibits

Address: "Acute Appendicitis in the Extremes of Life." Dr. Urban Maes, Professor of Surgery,

Louisiana State University Medical Center, New Orleans, La.

Address: "Studies in Abdominal Pain." Dr. Frederick J. Kalteyer, Clinical Professor of Medicine, Jefferson Medical College, Philadelphia, Pa.

Address: "Traumatic Subdural Hematoma." Dr. William James Gardner, Cleveland Clinic, Cleveland, Ohio.

ASSEMBLY DINNER

Twentieth Anniversary Ceremony.

Address, The Honorable Herbert A. Bruce, Lieutenant Governor of Ontario, Toronto, Ontario, Canada.

Address, Rear-Admiral Cary T. Grayson, Chairman, The American Red Cross, Washington, D. C.

Thursday, October 17

8 A. M.

Diagnostic Clinic: "Psychoses Associated with Organic Brain Diseases." Dr. Louis J. Karnosh, Assistant Clinical Professor of Nervous Diseases, Western Reserve University School of Medicine, Cleveland, Ohio.

Diagnostic Clinic: "Differential Diagnosis Between Gastric and Duodenal Ulcer and Gall Stones." Dr. William D. Haggard, Professor of Clinical Surgery, Vanderbilt University School of Medicine, Nashville, Tenn.

Diagnostic Clinic: "Ménière's disease." Dr. Walter E. Dandy, Adjunct Professor of Neurological Surgery, Johns Hopkins University School of Medicine, Baltimore, Md.

Intermission for Review of Exhibits

Diagnostic Clinic: "Cardiac Diseases." Dr. Harlow Brooks, Emeritus Professor of Clinical Medicine, New York University and Bellevue Hospital Medical College, New York, N. Y.

Address: "Treatment of Hyperinsulinism." Dr. E. Starr Judd, Professor of Surgery, University of Minnesota Graduate School of Medicine, Rochester, Minn.

Noon Intermission

Diagnostic Clinic: "Conditions Producing Splenomegaly." Dr. Campbell P. Howard, Professor of Medicine, McGill University Faculty of Medicine, Montreal, Canada.

Diagnostic Clinic: "Obstructive Jaundice." Dr. Waltman Walters, Associate Professor of Surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minn.

Address: "Low Back Disability." Dr. Wallace S. Duncan, Cleveland, Ohio.

Address (Subject to be announced). Dr. Charles H. Mayo, Rochester, Minn.

Intermission for Review of Exhibits

Address: "Trigeminal Neuralgia." Dr. Charles H. Frazier, John Rhea Barton, Professor of Surgery, University of Pennsylvania School of Medicine and Professor of Neurologic Surgery, University of Pennsylvania Graduate School of Medicine, Philadelphia, Pa.

Address: "Bacterial Endocarditis." Dr. Ralph A. Kinsella, Professor of Internal Medicine, St. Louis University School of Medicine, St. Louis, Mo.

Address: "The Treatment of Diseases of the Nasal Sinuses in Infants and Young Children." Dr. Lee W. Dean, Professor of Otolaryngology, Washington University School of Medicine, St. Louis, Mo.

Dinner Intermission

Address: "Diseases of the Thyroid Gland." Dr. James H. Means, Jackson Professor of Clinical Medicine, Harvard University Medical School, Boston, Mass.

Address: "Agranulocytosis." Dr. Russell L. Haden, Chief of the Medical Division, Cleveland Clinic, Cleveland, Ohio.

Address: "A Decade's Advance in Ophthalmology." The Joseph Schneider Foundation Presentation. Dr. William H. Wilmer, Professor Emeritus of Ophthalmology, Johns Hopkins University School of Medicine, Baltimore, Md.

Address: "Diagnosis and Treatment of Cancer of the Lip, Mouth and Throat." Dr. Arthur C. Christie, Professor of Clinical Radiology, Georgetown University Medical School, Washington, D. C.

Friday, October 18

8 A. M.

Diagnostic Clinic: "Traumatic Surgery of the Knee." Dr. John J. Moorhead, Professor of Clinical Surgery, New York Post Graduate Medical School, New York, N. Y.

Diagnostic Clinic: "Diabetes." Dr. Elliott P. Joslin, Harvard University Medical School, Boston, Mass.

Diagnostic Clinic: "Malignant Tumors of the Breast." Dr. Dean D. Lewis, Professor of Surgery, Johns Hopkins University School of Medicine, Baltimore, Md.

Intermission for Review of Exhibits

Diagnostic Clinic: "Hypertension." Dr. George Crile, Cleveland Clinic, Cleveland, Ohio.

Diagnostic Clinic: "Deficiency Diseases in Adults." Dr. William Gerry Morgan, Dean and Professor of Gastro-Enterology, Georgetown University School of Medicine, Washington, D. C.

Noon Intermission

Diagnostic Clinic: "Obstructive Lesions of the Bladder." Dr. Joseph F. McCarthy, Professor of Clinical Urology, Executive Officer of the Department of Urology, New York Post Graduate Medical School, Columbia University, New York, N. Y.

Address: "The Stomach's Response to the Menu." Dr. T. Wingate Todd, Henry Willson Payne, Professor of Anatomy, Western Reserve University School of Medicine, Cleveland, Ohio.

Address: "Further Advances in Our Knowledge of the Thymus and Pineal Glands." Dr. Leonard G. Rowntree, Director, Philadelphia Institute for Medical Research, Philadelphia, Pa.

Intermission for Review of Exhibits

Address: "The Diagnosis and Treatment of Surgical Lesions of the Pancreas." Dr. Irvin Abell, Clinical Professor of Surgery, University of Louisville School of Medicine, Louisville, Ky.

Address: "The Diagnosis and Management of the Septic Appendix." Dr. W. Wayne Babcock, Professor of Surgery and Clinical Surgery, Temple University School of Medicine, Philadelphia, Pa.

Address: "Surgical Treatment of Gall Stones." Dr. Frank H. Lahey, Director of Surgery in the Lahey Clinic; Surgeon to the New England Baptist Hospital and New England Deaconess Hospital, Boston, Mass.

AN INVITATION FROM THE INDIANA STATE MEDICAL SOCIETY

All members of the Illinois State Medical Society are invited to attend the annual session of the Indiana State Medical Association, to be held in Gary, October 8, 9 and 10, with headquarters at the Hotel Gary.

A list of the out-of-state speakers is as follows:

Isaac A. Abt, M. D., Professor of Pediatrics, Northwestern University Medical School, Chicago.

Ralph M. Waters, M. D., Professor of Anesthesia, University of Wisconsin Medical School.

Norman F: Miller, M. D., Professor of Obstetrics, University of Michigan Medical School.

Louis J. Karnosh, M. D., Asst. Clinical Professor of Nervous Diseases, Western Reserve University School of Medicine.

A. L. Schwartz, M. D., Cincinnati.

J. Tate Mason, M. D., President-elect, American Medical Association.

Virgil S. Counsellor, M. D., Asst. Professor of Surgery, University of Minnesota, Graduate School of Medicine.

Sanford R. Gifford, M. D., Professor of Ophthalmology, Northwestern University Medical School.

Elexious Thompson Bell, M. D., Professor of Pathology, University of Minnesota Medical School.

William F. Braasch, M. D., Professor of Urology, University of Minnesota, Graduate School of Medicine.

Louis George Herrmann, M. D., Asst. Professor of Surgery, University of Cincinnati College of Medicine, Cincinnati.

Emmet F. Horine, M. D., Associate Clinical Professor of Medicine, University of Louisville School of Medicine.

MISSISSIPPI VALLEY MEDICAL SOCIETY MEETING

The first annual meeting of the newly formed Mississippi Valley Medical Society will be held at Quincy, Ill., October 2-3-4. The meeting and commercial exhibit will be held in the new and thoroughly modern Lincoln-Douglas Hotel. There will be morning, afternoon and evening sessions of a most practical character. The entire program is arranged to especially appeal to the general practitioner.

Among the eminent clinicians on the program are:

Isaac A. Abt, M. D., Prof. of Pediatrics, Northwestern University School of Medicine.

Fred H. Albee, M. D., Prof. of Orthopedic Surgery, New York Post-Graduate Medical School and Hospital.

W. Wayne Babcock, M. D., Prof. of Surgery, Temple University School of Medicine.

Hugh Cabot, M. D., Prof. of Surgery, University of Minnesota Graduate School of Medicine.

Arthur C. Ernstene, M. D., Cardiologist, Cleveland Clinic.

Frederick A. Figi, M. D., Assoc. Prof. of Laryngology, University of Minnesota Graduate School of Medicine.

Thomas E. Jones, M. D., Gynecologist, Cleveland Clinic.

Wm. C. MacCarty, M. D., Prof. of Pathology, University of Minnesota Graduate School of Medicine.

Albert Soiland, M. D., Chairman, Malignancy Board, California Hospital of Los Angeles.

These men will each give two or three practical lectures or clinical demonstrations and will be assisted by 27 specialists from Illinois, Missouri and Iowa who will conduct a clinical lecture course. There will be a total of over 50 lectures and demonstrations for the three day session. All ethical physicians are cordially invited to attend the meeting and a detailed program may be obtained from Harold Swanberg, M. D., Sec.-Treas., 211-224 W. C. U. Bldg., Quincy, Illinois.

ANNUAL CONVENTION OF THE ASSOCIATION OF MILITARY SURGEONS

The Association of Military Surgeons of the United States is to hold its 43rd Annual Convention at the Waldorf Astoria Hotel, New York City, October 3, 4 and 5. An excellent program—offering discussions by outstanding men of the country, on the latest scientific phases of Medicine, Surgery, Hygiene and Hospital methods will be presented. In addition a large number of exhibits by leading medical and surgical supply houses and various Government agencies will be on display.

The Association extends to you and the members of your Society a cordial invitation to attend all meetings.

EXTENSION EDUCATION IN PHYSICAL THERAPY

One of the aims of the Council on Physical Therapy of the American Medical Association is to promote extension education in physical therapy.

The Committee on Education of the Council believes that one of the best ways of extending postgraduate instruction in physical therapy is to arrange for practical talks to be given before state, county or other medical societies. Experience, especially in New York and Pennsylvania, has shown that such programs are eagerly received by the profession.

The Council is prepared to assist medical societies by furnishing general advice as to programs and by suggesting qualified personnel.

The following topics are offered as being of interest to the general practitioner:

The Present Status of Physical Therapy.
Physical Therapy in General Practice.
Body Mechanics and Posture Training.
Massage—Indications and Effects.
Pathological Conditions Helped by Physical Therapy.
Therapeutic Exercise.
Radiation Therapy.
Hydrotherapy.
Fever Therapy.
Diathermy, Medical and Surgical, Including Short Wave.

Motion pictures on the following subjects are available for loan:

Massage—Technic.
Graduated Active Motion.
Occupational Therapy.
Effects of Heat and Cold on Blood Circulation.
Effects of Massage on Blood Circulation.

In addition, exhibits on physical therapy can be arranged in conjunction with the Committee on Scientific Exhibit, available on request.

Anyone desiring help in program planning or loans of films or exhibits is advised to write the Secretary, Council on Physical Therapy, A. M. A., 535 North Dearborn Street, Chicago, Illinois.

AMERICAN PUBLIC HEALTH ASSOCIATION CONVENTION

Leaders of public health and preventive medicine from every state of the union and from several foreign countries are to be at hand for the sixty-fourth annual convention of the American Public Health Association to be held in Milwaukee, Wisconsin, from Oct. 7 to 10.

Workers in all fields of public health, medical men, nurses, specialists in research and others in allied activities are to be among the 3,000 delegates expected at the convention.

Important developments of the year in preventive medicine, in the extension of public health work and in the constant war on contagious disease will be unfolded at the gathering. The convention has come to be the place at which first announcement is made of scientific advances in public health and disease prevention.

Simultaneous with the association's sessions, ten other closely related organizations are to convene. They are the Association of Dairy, Food and Drug Officials, American Association of School Physicians, Association of Women in Public Health, Conference of State Sanitary Engineers, Conference of State Laboratory Directors, Conference of Wisconsin Health Officers, State Registration Executives and State Directors of Public Health Nursing, International Society of Medical Officers of Health, and National Committee of Health Council Executives.

Over 400 papers are to be presented, dealing with such widely varied subjects as mental hygiene, diphtheria and scarlet fever immunization, poison in food, public sanitation, treatment of sewage and polluted waterways, public health engineering, planned milk control, laboratory studies with toxins and vaccines, tuberculosis, milk-borne disease, water purification, new methods in reporting vital statistics, industrial hygiene, food and nutrition.

Sessions of the association itself are to be divided among its ten constituent sections—health officers, laboratory, vital statistics, public health engineering, industrial hygiene, food and nutrition, child hygiene, public health education, public health nursing and epidemiology.

There will be authoritative presentations on amebic dysentery, hemolytic streptococci, whooping cough, gonococcal infection, tuberculosis and undulant fever. A large number of papers are to be presented on filterable viruses, and on prophylactic and therapeutic vaccination. Recent progress in biological products, and research accomplishments of the year in the milk and dairy field have also been assembled for the program.

Among the outstanding physicians and health leaders who will speak at the convention are: Dr. E. L. Bishop, president of the association and director of health of the Tennessee Valley Authority; Dr. Walter H. Brown, president-elect of the association and professor of hygiene at Stanford university in Palo Alto, Cal.; Dr. Herman N. Bundesen, president, board of health, Chicago; Dr. W. G. Campbell, chief of the United States food and drug administration, Washington; Dr. A. J. Carlson, professor of physiology, University of Chicago.

Others include: Dr. Haven Emerson, professor of public health practice, Columbia university; Dr. John A. Ferrell, associate director, International health division, Rockefeller foundation, New York; Dr. Morris Fishbein, editor, Journal of the American Medical association; Dr. Grant Fleming, professor of public health, McGill university, Montreal; Dr. Iago Galdston, executive secretary, Medical Information bureau, New York; Dr. John P. Koehler, Milwaukee health commissioner; Dr. Carl S. Pederson, chief in research, Agricultural Experiment Station, Cornell university. Health commissioners of most large cities and research men on the staff of foundations and major industries are also on the program.

This great congress, which has an enviable record of scientific contributions, is designed to appeal to members of the public health and medical professions alike. Headquarters are to be at the Milwaukee Auditorium. Scientific and educational exhibits will be spread through one hall of this building. Entertainment and social events are also planned for the convention.

DINITROPHENOL AND CATARACT

In this issue of The Journal appear reports of several cases in which cataract seems to have occurred almost in the form of a malignant development in persons who had been taking dinitrophenol for long periods of time. The coincidence is of interest regardless of whether or not it may be established that the disturbance arose because of the dinitrophenol or because of some other undetected cause. It should, of course, be borne in mind that dinitrophenol has not been standardized chemically. The possible occurrence of toxic

contaminants in preparations of dinitrophenol must be considered. The possibility also exists that the cataracts may have resulted from associated malnutrition and an unbalanced diet, which are in many instances a part of the program of those who attempt rapid reduction of weight by the use of dinitrophenol or other methods. The Journal has warned its readers repeatedly against the dangers of uncontrolled use of new preparations of this type. The incident here recited serves as a further warning against use of these products until the actual merits and dangers may be more definitely determined. The report of the Council on Pharmacy and Chemistry rejecting dinitrophenol[2] for inclusion in New and Nonofficial Remedies, published last week, further emphasizes the hazards of the use of dinitrophenol and related substances.—*Jour. A. M. A.*, July 13, 1935.

1. Horner, W. D.; Jones, R. B., and Boardman, W. W.: Cataracts Following the Use of Dinitrophenol, this issue, P. 108. Boardman, W. W.; Rapidly Developing Cataract After Dinitrophenol, p. 108.

2. Dinitrophenol Not Acceptable for N. N. R., Report of the Council on Pharmacy and Chemistry, J. A. M. A., 105: 31, 1935.

THOMAS McCRAE

The last of the Guelph McCraes! For, of the two boys of Colonel David McCrae, Tom left no issue and John never married. A great pity! It was a stock that would ever bear fine fruit. Tom's father, in 1917, at the age of seventy, recruited and trained in Guelph, and led overseas to England, a field battery; and was sore tried when he was not allowed, by reason of his age, to lead his men on to France and into action. The end did not crown his work. The mother of Tom and John, Janet Eckford, was a rare woman, (though not so rare in Scotland); one who was on the same intellectual level as her men-folk, perhaps above them (though not John) in humour and kindliness. And where shall we find in this world a thing more good and delectable! ((How often did John quote to the writer the witty parts of her letters!) And then the two sons, Tom and John, both of whom attained high eminence in the practice and in the teaching of Medicine. In the fundamentals,—clear-eyed honesty, great industry, high-thinking, love of learning, intolerance of meanness, a profound sense of religion in its deep and tender meaning—the two were alike. On the lighter side, the side of good-fellowship, John had the easier and surer touch. Of him Lord Grey said, on the occasion of that well-known trip from Winnipeg by Hudson's Bay, Labrador, Nova Scotia, not forgetting Orwell, in P. E. I., and so round to Montreal—"Yes, McCrae was with us. We travelled 3,000 miles, and McCrae had a story for every mile." But Tom was graver, more serious, though he also was full of quiet humour. He was a slave to duty—a willing slave. It would be hard to find a man who failed less often in doing his job to the last tittle. And what was his job? The study of books, the care of patients, the teaching of students, the recording of his own knowledge as he gained it; and, finally, to come to the particular, the collaboration with his great Chief in that *magnum opus*, the Osler-McCrae "Modern Medicine." In this last, on which he did a very large share of the editorial work, besides contributing the chapters on Typhoid Fever and on Arthritis, and also in his admirable revision of the later editions of Osler's Text-Book, after Osler's death, we see his real monument, his title to the regard and the admiration of his fellows and of those who shall come after. Thomas McCrae was a deep student, a fine clinician, a great teacher, both in the printed and the spoken word, and an admirable friend.

Honour to whom honour is due! Let us, therefore, add a word of honour for her who, throughout their married life, helped Tom McCrae to accomplish his life's work. The many many hours which he spent at his writing-desk, after the day's routine was over, were her sacrifice to his career, her contribution to his success. They also serve who stand and wait. None the less a sacrifice, however willing, however loving a one!

Dr. E. W. Archibald, in Canadian Medical Journal.

METHOD OF EVALUATING CARDIAC PAIN IN CHILDREN

is unique in that it makes it possible, in a number of cases, to determine a subjective symptom—pain—in an objective way. In their 100 children sensitivity to pain was tested by pressure over the mastoid process and then over the styloid process. This pressure was gradually increased, depending on the response of the child. When the patient did not complain, the pressure was the maximum that could be obtained by first pressing both thumbs together and then the forefingers, thus ensuring a uniform stimulus. Several physicians of the clinic repeated these tests on some of the children and obtained the same responses that were recorded previously. Before making the test, the examiner must be certain that there is no local disease in the region of the mastoid, otitis media, mastoiditis, enlarged postauricular glands, painful scars of old mastoidectomies, and skin abrasions or lesions preclude testing that area. Normally, pressure over the mastoid causes no pain, which may be used as a control reading. The same amount of pressure applied to the styloid tips is painful to a few but painless to most individuals. The pressure should be applied in one direction, since rubbing the bones evokes the painful response of rubbing the periosteum. The presence of heart sensations, i. e., pain or palpitation, in the group who normally do not complain of pain on pressure over a bony region is usually accompanied by active cardiac disease in the majority of cases. A total of thirty-six patients had demonstrable pathologic changes of the heart, while a total of twenty-seven patients complained of precordial symptoms, again illustrating the close parallelism between cardiac damage and pain. Those children who complain of severe pain following pressure on a bony area usually complain of cardiac pain and often do not have any active cardiac lesion. In the course of an acute rheumatic infection, cardiac pain and palpitation are valuable symptoms for the diagnosis of carditis. Unless they are specifically sought for, they will be frequently overlooked.

ENTEROGENOUS CYSTS OF THE DUODENUM: REPORT OF A CASE AND REVIEW OF THE LITERATURE

Clarence E. Gardner, Jr., and Deryl Hart, Durham, N. C. (*Journal A. M. A.*, May 18, 1935), treated a case of cyst of the duodenum successfully by anastomosis with the intestinal tract. Six cases of this rare condition have been collected from the literature, with a mortality of 100 per cent. Three of the collected cases were treated surgically, two by external drainage. The operation of choice seems to be permanent internal drainage into the intestinal tract. There are two methods of accomplishing this, one having been used in the case reported. No case has been diagnosed before operation or necropsy. The symptoms are those of duodenal obstruction, with a palpable mass in the right upper part of the abdomen. An embryonic diverticulum is the probable origin of the cyst. Choledochus cysts probably have a similar origin from the persistence of diverticula that occur along the bile ducts during embryonic life.

THE NEW DEAL

(By Ogden Nash in New Canaan (Conn.) Advertiser)

Higgledy, piggledy, my black hen,
She lays eggs for gentlemen.
Gentlemen come every day
To count what my black hen doth lay.
If perchance she lays too many,
They fine my hen a pretty penny;
If perchance she fails to lay,
The gentlemen a bonus pay.

Mumbledy pumbledy, my red cow,
She's cooperating now.
At first she didn't understand
That milk production must be planned;
She didn't understand at first
She either had to plan or burst,
But now the government reports
Shes' giving pints instead of quarts .

Fiddle-de-dee, my next-door neighbors,
They are giggling at their labors.
First they plant the tiny weed,
Then they water, then they weed,
Then they hoe and prune and lop,
Then they raise a record crop,
Then they laugh their sides asunder,
And plow the whole caboodle under.

Abracadabra, thus we learn,
The more you create, the less you earn,
The less you earn, the more you're given,
The less you lead, the more you're driven,
The more destroyed, the more they feed,
The more you pay, the more they need,
The more you earn, the less you keep.
And plow the whole caboodle under.

UNDULANT FEVER

Giugni (*Policlinico*, Rome, March 23, 1935) finds that on the intravenous administration of antimelitensis vaccine in doses ranging from 5 million to 300 million micro-organisms—no less than eight and no more than ten injections being given to each patient—a good degree of tolerance is established, without danger even in grave cases. After a pronounced reaction the fever subsided in all his cases and the size of the liver and spleen was rapidly reduced. The author suggests the use of large doses in the absence of contraindications such as lesions of vital organs. Cure in Giugni's cases was rapid and complete.

HE WHO FEARS CRITICISM IS HELPLESS

Thomas Jefferson said: "He who fears criticism is helpless. Only those who do things are criticised. The idler is lost sight of in the march of events, but the doer is watched and criticized."

EXPERIMENTAL DIABETES

An interesting observation on the control of experimental pancreatic diabetes is made by Warren G. Nelson in *Endocrinology* 19:187 (March-April). "In four monkeys," the writer says, "the profound hyperglycemia and glycosuria which followed pancreatectomy were abolished by the injection of estrin," the ovarian follicular hormone.

CUT OUT AND READ ONCE A WEEK

Never be idle.
Make few promises.
Always speak the truth.
Never speak ill of anyone.
Keep good company or none.
Live up to your engagements.
Be just before your are generous.
Earn money before you spend it.
Drink no kinds of intoxicating drinks.
Good character is above all things else.
Keep your own secrets if you have any.
Never borrow if you can possibly avoid it.
Keep your promise if you would be happy.
Make no haste to be rich if you would prosper.
When you speak to a person, look him in the face.
Save when you are young, to spend when you are old.
Never run in debt unless you see a way to get out again.
Avoid temptation, through fear you may not withstand it.
Ever live (misfortune excepted) within your income.
Small and steady gains give competency and tranquility of mind.—Ex.

CRAMPING HIS STYLE

Golfer: "Hi, caddie! Isn't Major Pepper out of that bunker yet? How many strokes has he had?"

Caddie: "Seventeen ordinary, sir, and one apoplectic!"—*Boston Transcript.*

Original Articles

PRINCIPLES OF INTESTINAL SURGERY

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By principles, we understand basic facts on which to build a comprehensive diagnosis and outline a rational treatment of surgical lesions of the intestinal tract. No detailed description of individual situations can be discussed in a paper of this scope.

Whoever practices intestinal surgery should have a clear conception of the congenital or acquired anomalies which may be the cause of dysfunctions requiring operative correction. A review of surgical principles can only touch lightly on the most important derangements of intestinal rotation and fixation and merely mention by name such failures of obliteration as a Meckel's diverticulum. Not all anomalies of position produce symptoms; some are diagnosed accidentally in the course of laparotomies undertaken for conditions not related to the intestinal tract. Conversely, an abnormal position of the cecum, for instance, may mask an appendicitis which can remain undiagnosed until perforation and peritonitis tragically clears the picture. According to Folger and Robbins,[1] the process of intestinal rotation can conveniently be divided into three periods of evolution: (a) From the time during which the midgut loop occupies the embryonal umbilical hernia and until it is returned to the abdominal cavity at about the tenth week; (b) From the end of the first stage to the time when the cecum reaches the right loin in the eleventh week; and (c) From the end of the second stage until shortly after birth. Failure of the intestine to rotate beyond the first stage is seen in exomphalos, in which condition the embryonic hernia into the root of the umbilical cord persists in part or in full until birth. The second stage is one of reduction and of major rotation of the midgut loop. Anomalies of development in this stage, according to Dott,[2] are: non-rotation, mal-rotation and reversed rotation. In non-rotation the small intestine lies to the right of the mid-line and the colon to the left. The terminal ileum crosses the midline and enters the cecum from the right instead of from the left. In this position there may be no secondary fixation of the mesentery, the entire midgut hanging free from the narrow duodenocolic isthmus. Such an arrangement predisposes to the development of a volvulus of the entire midgut loop. Twenty-three such cases were recently reviewed by Gardner and Hart.[3] Malrotation may be briefly described as a combined irregular defect of rotation and fixation. The cecum and ascending colon retain their primitive mesentery in common with that of the small intestine. Cruveilhier in 1827 first described a mesenterium commune. The attachment of the mesenteric root to the abdominal wall is very short and volvulus of the common mesentery may be produced (Dott). Seven cases have been observed in which there was some obstruction to the duodenum because of such an anomaly. Haymond and Draggstedt[4] and Hickley and Cameron,[5] reported cases in which a massive intra-abdominal hernia was simulated by rotation of the pre-arterial loop into the mesentery of the post-arterial segment between the superior mesenteric artery and the colon. A peritoneal sac is thus formed which may contain the entire small intestine. In reversed rotation the transverse colon passes dorsally to the duodenum and superior mesenteric artery. Fixation of the cecum and ascending colon is usually incomplete and torsion of the mobile right half of the colon with obstruction of the transverse colon at the site of the tunnel through the root of the mesentery may readily occur. The third or final stage of rotation includes the descent and fixation of the cecum in its normal position, the fixation of the descending colon and the fixation of the last portion of the duodenum. The important feature of this stage is the fixation of the cecum to the right iliac fossa so that the mass of small intestine, originally dependant from a narrow pedicle at the origin of the superior mesenteric artery, acquires a broad oblique attachment to the posterior abdominal wall. It is the absence of this broad attachment which predisposes to volvulus of the entire mesentery. Failure of the cecum to elongate and undergo early fixation explains the subhepatic and lumbar positions of this organ. Deficient fixation of the ileocecal segment predis-

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poses to the formation of volvulus of the cecum or ileocecal segment (Gardner-Hart).

It must be generally conceded that a correct preoperative diagnosis of the etiology of the obstruction cannot be made in any of these developmental maladjustments. Clinically they give rise either to repeated attacks of rapidly subsiding colic, produce symptoms of partial obstruction or, more rarely, of fulminating complete obstruction and strangulation.

Stated in as few words as possible, in the embryonal evolution of the gastrointestinal tract, torsion of the primary loop of intestine occurs in a general way as follows:

The large intestine at first forms part of the posterior half of the intestinal loop, and the loop is in the median plane. Later the loop rotates so that its plane is transverse. The anterior half is then on the right and the posterior half on the left. Further rotation causes the posterior half to become anterior. In side view, the large intestine crosses the small intestine. Much later in embryonal development the torsion is completed by migration of the cecum to the right side of the body and down towards the pelvis. When this has occurred, the colon passes from right to left, ventral to the upper part of the small intestine; it then descends to the rectum on the left of the small intestine. Anomalies which the surgeon may encounter include: Imperfect torsion of the intestinal loop, Meckel's diverticulum, atresia of a segment of bowel, stenosis of one or more segments, diverticula other than Meckel's, cysts, polyps and fibromata.

Diverticula of the duodenum, especially near the outlets of the pancreatic ducts, are relatively common. They are generally round sacs, opening into the duodenum by clear-cut circular orifices. As they tend to push their way through the muscularis, they are really herniae of the mucous membrane or false diverticula. It is believed that they are produced by the distention of the upper part of the duodenum following an obstruction lower down. Anyone interested in the study of duodenal anomalies should read the splendid paper published by Dyas in 1931[6]. Clinically the symptoms produced have, not infrequently, led to ill-advised and disappointing cholecystectomies. Occasionally a single diverticulum has been found in the jejunum or ileum; more often they are multiple and occur in old people. Intestinal cysts may be found at birth or they may develop in adult life and give rise to partial or complete obstruction. We recently[7] reported an unusual case of adenomatous polyposis of the first portion of the jejunum in a four-month-old infant with clinical symptoms closely simulating pyloric stenosis. At operation a large walnut-size tumor presented itself which proved to be a partial intussusception with the adenomatous polyp at its base. Resection and end-to-end anastomosis was rapidly performed but the infant died of shock the same day.

The sigmoid colon is relatively long and freely movable at birth; frequently in the adult the sigmoid colon is excessively long, forming two or three very large coils. Should an annular carcinoma develop in such a sigmoid, volvulus, intussusception or pathologic anastomosis may occur. We have seen one such case in our experience. Congenital stenosis and atresia are less frequently in the colon than in the small intestine. Acquired stenoses following amebic dysentery or hemorrhagic colitis or caused by annular carcinomas are much more common in the colon. Diverticula of the colon are frequent, usually acquired late in life. We have encountered and reported a case in which the combination of diverticulitis, megacolon and annular carcinoma of the sigmoid coexisted.

Turning from anatomical anomalies to physiological functions, we now know that, at the end of normal gastric digestion, when the stomach has emptied its content and strongly acid gastric juice has accumulated in the stomach, the pylorus opens and a regurgitation of the duodenal content occurs which reduces the acidity of the gastric juice. Before we became familiar with this fact, the presence of bile in the stomach was looked on with anxiety. The chief alkaline constituent of the duodenal contents is not the bile, whose color gives it prominence, but the strongly alkaline pancreatic juice, and the presence of duodenal contents in the stomach at the end of normal gastric digestion is probably a protective measure against the excessive acidity of the gastric juice that follows the emptying of food from the stomach, when the acid of the gastric juice has no such buffer as the food. (Horsley). This more or less constant admixture of gastric and intestinal juices explains the scanty bacterial

content of the upper part of the small intestine, brought about by the bactericidal action of hydrochloric acid. Surgeons should remember that the scantiness of bacteria in the upper small intestine, together with the more abundant blood-supply, is especially favorable to the healing of anastomoses in this region. According to Horsley, one row of continuous sutures with a few interrupted sutures for reinforcement, seems to be better than multiple layers which turn in much tissue and thus may cause obstruction in this sensitive bowel with its active and rather delicate peristalsis. Our own preference has been to increase the diameter of the anastomosis by angular section of the bowel and the use of the classical double row of sutures with careful closure of the mesenteric gap. In the lower portions of the small intestine, while it is true, as demonstrated by Monks,[9] that the fat mesenteric border increases the difficulties of end-to-end anastomosis, we nevertheless prefer it to lateral union which always disturbs the normal peristaltic rhythm and carries with it the additional risk of leaving blind pockets on either side of the anastomosis. Careful end-to-end suturing of the bowel and closure of the triangular mesenteric space with a minimum obstruction of the blood supply removes all danger.

Quite recently Roberts,[10] in a short but excellent paper, correlated the present-day concepts which can be accepted as physiological premises upon which to base conclusions and outline medico-surgical treatment. These are:

1. The normal amount of gastric, pancreatic, biliary and intestinal secretion in twenty-four hours is more than the total quantity of combined blood and lymph in the body. In adults the total quantity passing through the upper gastrointestinal tract for reabsorption in the lower bowel averages from five to seven liters daily (McIver).

2. Fluid enters the lumen of the gastrointestinal tract by way of the mucosa even though none is taken by mouth.

3. Water and inorganic salts are not absorbed in the stomach, duodenum or jejunum but must be carried by peristalsis to the lower ileum and colon for reabsorption.

4. A continued loss of gastric juice results in the production of alkalosis, while loss of pancreatic juice and bile with the resultant decrease in sodium, produces changes in the blood-chemistry characteristic of acidosis.

The significance of intestinal distention and its proper interpretation is of considerable importance in making an accurate or working diagnosis which may decide for or against an immediate surgical intervention. Is the distention general or local; does it involve the large or small bowel; is it accompanied by an increase in peristalsis, or have all intestinal contractions ceased? These are cardinal questions which the diagnostician should endeavor to answer satisfactorily whenever possible. It is a well known fact that non-penetrating trauma of the abdomen or crush fractures of the lower ribs often produce a severe grade of paralytic ileus in the absence of any discoverable intraperitoneal injury. Wills and Atsett[11] call attention to what neurologists have long maintained, namely, that conditions remote from the apparent location of the disturbance—extra-visceral conditions—may produce signs similar to those of pathologic involvement of viscera. They present the histories of a number of cases of dorsi-lumbar sprains with transitory distention of the abdomen associated with pain, nausea and emesis. Watchful waiting and local treatment of the myositis or myo-fascitis soon cleared the diagnosis in all of their cases. The classical "solar plexus" blow of the pugilist is a mild example of acute transitory paralytic ileus. One must assume that some irritation of the autonomic system has occurred which paralyses the intestinal musculature with instant cessation of all peristalsis. When the trauma received has been a mild one, intestinal motor power is recovered within a few minutes to a few hours and intestinal function restored. Occasionally the damage is more severe and the signs and symptoms of obstruction become so pronounced that one finds great difficulty in establishing the absence of a serious intra-abdominal lesion. (Orr.[12]) On opening the distended abdomen one may find a slight tear of visceral peritoneum of one or more loops; at other times, there may be a linear tear in the mesentery with slight or absent hemorrhage; or again, there may be found only an acute edema of the traumatized intestine with petechial hemorrhages dotting a small segment. The safe surgeon should not hesitate to explore in all honestly doubtful cases. Infinitely better and

safer for the patient is it to open an abdomen and find nothing to repair—or at best only a superficial tear of serosa or mesentery which can be closed with a couple of sutures—than to procrastinate until severe toxemia or general peritonitis is manifest.

Distention is usually universal in sympathetic plexus traumatism, spreading peritonitis, spinal cord lesions, mesenteric vessel thromboses and in intoxications such as from morphine, lead, etc. On the other hand, in all cases of mechanical ileus, whether of the strangulation or obturation type, distention of bowel is always primarily local and proximal to the site of obstruction. Increased peristalsis proximal to the lesion is always present and persists until peritonitis ushers in the paralytic ileus picture. As a general rule, abdominal distention centering around the umbilicus is indicative of simple obstruction or strangulation of small bowel, whereas, if the colon alone is involved, the distention is most marked in the flanks and epigastrium. In patients with thin abdominal walls it is even possible at times to see the outline of the distended colon.

Wangensteen[13] is of the opinion that 80 per cent. of the gas in the intestinal canal is "swallowed gas." This may be true in health, but, in the presence of intestinal obstruction, with the patient vomiting and unable to swallow and retain solids or liquids, other sources of gas must be found to explain the often enormous distention found in acute cases. According to Wiggers,[14] "distention of intestines is partly due to liquid, but to a considerable extent to gas. This excess of gas is only partly due to fermentative and putrefactive changes, but is largely the result of diffusion of blood gases in the intestine. The low tonus of the intestinal tract in obstruction increases the vascular supply of the mucosa by lack of extra-vascular support and the dilated capillaries in consequence give off larger volumes of their gases. It is also possible that distention increases the permeability of the mucosa for toxic substances or that toxins are formed in the abnormal membrane itself. It is also probable that the increased activity of gas forming bacteria of the B. Welchii group may account for some of the gaseous distention." While a larger volume of blood is carried to the affected intestine, Wangensteen is on solid ground when he states that there is lessened venous absorption and increased lymphatic and transperitoneal absorption in intestinal obstruction.

By simple observation of a patient's abdomen, with natural or artificial light shining on it obliquely, much can be deduced, especially if the case is seen early. The sausage-like tumor of intussusception, peristaltic wave of a pyloric stenosis, visible coils of small intestine vainly attempting to overcome a mechanical obstruction, rhythmic contraction of the abdominal wall with spontaneous increased flexion of the lower limbs to lessen the pain of peristalsis, and atypical distention of both flanks in colon obstructions can all be noted and estimated. Observation is not time consuming and should never be omitted.

Palpation, properly carried out, is of extreme importance; improperly, i. e., forcibly undertaken, it defeats its own purpose. One cannot too strongly stress the necessity of exerting gentleness, of palpating with the pulp of the fingertips and not the nails and of allowing the flattened hand to lie gently on the abdomen in order to catch peristaltic waves. In differentiating between a possible perforation of a duodenal ulcer where the gastric content is apt to pass along "Moynihan's gutter"—the watershed formed by the ascending colon—and accumulate in the right iliac fossa, and acute appendicitis, Rovsing's sign is of the greatest value. Pressure over the upper sigmoid in the left iliac fossa forces gas into the cecum. If this maneuver causes increased pain in the right iliac fossa, the case is mostly likely one of appendicitis. Borborygmi can always be felt if present. Total absence of peristaltic waves and of borborygmi is evidence of ileus.

Percussion, except as a means of determining the presence of free fluid in the abdomen, a rise of liver dulness or of confirming distention of the colon has not, in our hands, proved to be of much value. Auscultation, contrariwise, particularly if repeatedly used, is of the greatest value. With a little experience the clinician easily learns to differentiate between the faint and fairly regular borborygmi of normal peristalsis and the loud, angry, combative explosions wasting their efforts against a totally or partially impassable obstruction. These intestinal noises coincide almost invariably with the height of the crampy pains of unbalanced peristalsis.

Total absence of borborygmi in cases of delayed diagnosis or where ill-advised doses of morphine mask the clinical picture, is of little help in differential diagnosis. Loud borborygmi, lessening in intensity and frequency over a period of hours, serve as a warning to the clinician that paralytic ileus is either threatening or already established. Wangensteen,[15] describing what the resident and attending staff of "obstruction minded" hospitals can hear, almost poetically states that:

"Loud peristaltic rushes, like the bubbling sound produced by pouring water out of a bottle, may be heard with the stethoscope when a mechanical obstruction exists. Near the point of occlusion these noises may attain an explosive force. Frequently a metallic tinkle may be heard, a sign of conclusive significance for the existence of a bowel under tension. As the fluid and air are carried downward toward the point of obstruction by peristaltic rushes, their progress is suddenly arrested and fluid and air which are intimately mixed in their advance, tend to separate as the onward movement is halted. As the air rises to the surface, a sound like drops of water falling in a rain barrel may be heard. The metallic character of the sound has a high pitch, imparted by the tension of the dilated intestine. Loud intestinal noises with maximum intensity at the height of the pain corroborate strongly the suspicion of mechanical occlusion. The coincident occurrence of gurgling sounds and intermittent pain is very significant. Only colics of the intestine are heralded by crampy pain and concomitant loud gurgling noises."

The cause, nature and action of the toxin: An infinite number of substances have been claimed to have toxic action, but it appears probable that it is either a proteose (Whipple), a toxic amine (Dragstedt and Dragstedt), or perhaps a histamine (Brager and Dale, Stone, Gerard). Concerning the mechanisms by which this toxin produces death, it is tacitly assumed that generalized destruction of protein and eventual renal involvement are accountable. Clinically, we have the classical picture of toxemic shock.

Summarizing, it seems probable that different factors may combine to produce the grave systemic symptoms. In cases of simple obstruction, loss of chloride and base, together with anhydremia, constitute the most important and often the only factors concerned. Toxemia enters to a minor but increasing extent as the obstruction occurs at progressively higher levels. On the other hand, in closed loops and strangulation, toxemia appears to be the chief factor and causes death before other factors have time to be produced. Clinically, one must admit some unexplainable similarity between toxemia of high obstruction, acute hemorrhagic pancreatitis, anaphylactic shock and bilateral adrenalectomy.

Low colonic obstruction (left side of the colon), causes less severe symptoms. Vomiting is not so frequent. In spite of a normal intake of fluids, dehydration slowly intervenes. Blood analysis in colon obstructions reveals the same tendency to dehydration, decrease in blood volume and increase in urea nitrogen as in high intestinal obstruction. The plasma chlorides, however, remain normal. Unrelieved by surgery, low colonic obstruction eventually proves fatal from toxemia.

An enormous amount of experimental work has been done in an endeavor to solve the riddle of intestinal toxemia. Beginning with Amussat in 1838, numerous investigators have battled with the problem: the end is not yet. According to Best, Newton and Meidinger[16] it is now generally admitted that in strangulation ileus, where the blood supply of an intestinal segment is totally shut off, toxemia is a strong factor in the causation of death; in simple obstruction the same is not true, or not proven. Substantiating the work of Roger and Garnier[17], Wangensteen in 1928 was able to establish the fact that there was equal toxicity of the contents of normal and of obstructed intestines and that apparently the contents below the obstruction were even more toxic than those above it.

A series of experiments carried out by Albeck, Kukula, Clairmont and Ranzi, Magnus-Elsleben, Braun and Borutten, Enderlen and Hotz, Davis, Cooper, White and Fender, Dragstedt and Dragstedt—and others, all suggested that there was no specific toxin in simple obstruction and that, therefore, the cause of death in non-strangulated ileus must be either increased absorption of substances normally present in the intestine, or the failure of a neutralizing process or "buffer reaction" which would ordinarily occur when the contents of the upper and lower intestines mingle. Control experiments by Best and associates (loc. cit.), would seem to prove that the intermixture of upper and lower intestinal contents is necessary, at least in part, for a normal physiochemical balance. It was also shown experimentally that there is no increase in the rate or selectivity of absorption above the obstruction,

and this seems strong evidence that increased absorption above the obstruction cannot be the cause of death. Furthermore it seems probable that there is no increased absorption below the obstruction.

What can the clinical surgeon deduce from all these interesting findings?

1. That the greater mortality in high intestinal obstruction is not due to toxemia in non-strangulated cases but to the fact that admixture of upper and lower bowel content is blocked;

2. That, where indicated, an enterostomy should be performed as near the ileocecal valve as possible because the higher the enterostomy the less is the "buffer reaction;"

3. That gastroduodenal siphonage and the reintroduction of the aspirated gastrointestinal juices by proctoclysis is a physiologically sound procedure;

4. That Wilkie[18], is quite logical in performing his temporary extra-abdominal intestinal anastomosis through a tube. He makes two short abdominal incisions, one above and one below the umblicus. Through the upper incision he seizes the highest accessible loop of distended jejunum and introduces a catheter using the Witzel technique. Through the lower incision he seizes an empty loop of ileum, introduces a second catheter and connects the two tubes by means of a glass tube. As a temporary, life saving, procedure in desperate cases this method should be more generally adopted.

5. That obstruction of the left colon is compatible with life for some time because intermixture and absorption of intestinal contents has already occurred above the obstruction.

Circulatory and respiratory failure and death in intestinal obstruction is now generally believed to be produced by an interaction and summation of a number of factors, any one of which alone would be sufficient to cause an irrevocable circulatory failure. Briefly stated these factors are:

1. *Anhydremia.* This is the direct result of increased gastrointestinal secretions, their failure to be reabsorbed, and elimination by vomiting. Dehydration reduces the circulating volume, decreases the output of the heart, lowers arterial pressures and produces stagnant anoxemia (reduction of oxygen), accounting for the cyanosis which is present unless prevented from manifesting itself by vasoconstriction. Intravenous injections of normal salt solution may prolong life *but,* owing to an unbalanced equilibrium (between intake and outflow), this solution is rapidly eliminated through the kidneys or through augmentation of gastrointestinal secretions, in the latter case continuing rather than breaking a vicious circle.

2. *Dechlorination.* Sufficient chloride is lost in the urine and gastrointestinal secretions to account for the reduction in blood and tissue chlorides, regardless of whether it is evacuated by vomiting or remains in the gastrointestinal tract. This loss of chlorides interferes with the maintenance of osmotic pressures of body fluids, of the acid-base balance and transport of carbon dioxide. Dragstedt and Ellis[19] believe the effects of dechlorination to be the same as those resulting from a total loss of gastric juice through a fistula.

3. *Alkalosis.* With the loss of chlorine ions in excess of base, a condition of alkalosis tends to develop becauss the base retained tends to combine with HCO_3.

4. The rise of blood urea and non-protein nitrogen is brought about by increased destruction of stored or tissue proteins, which strongly suggests that a toxic factor is at work.

Valuable as these findings are from the viewpoint of abstract science, they are of little help to the clinician because none of them are demonstrable early enough and furthermore they only obtain with regularity in high intestinal obstruction. While waiting for laboratory reports, a majority of these cases would die. Surgeons however owe a profound debt of gratitude to research workers for the practical application of some of their conclusions; for the therapeutic and operative improvements made possible by their abstract experimental findings. It is through them that we know of the greater mortality in strangulation ileus, of the life-saving and occasionally curative effects of continuous siphonage in simple obstructions, of the wisdom of doing a primary simple and rapid enterostomy, postponing removal of the cause of obstruction after the patient has been decompressed. Enterostomy, Wangensteen states: "Is life saving in late simple obstruction, not because it drains off a potent toxin that threatens the organism but because it relieves tension within the bowel, restores the normal blood sup-

ply, allows the continuance of absorption from the bowel (which practically ceases in obstruction) and permits the automatic establishment of the continuity of the bowel in the absence of a persistent intrinsic obstruction below." An important item in accomplishing decompression by means of the Wangensteen-Paine[20] nasal catheter suction siphonage is to have holes cut back on the distal end of the Levin tube for about ten inches, so that constant suction may be exerted in the stomach as well as in the upper portion of the small intestine, after the tip of the tube has gone beyond the pylorous. Siphonage is not a panacea; it has distinct limitations. It should not be used in any case of strangulation ileus which should be recognized by the great suddenness of its onset, high degree of shock and rebound tenderness on palpation. It is useless in carcinomas of the left colon. Suction should not be relied upon in any case which fails to show clinical improvement within six to ten hours. Wangensteen believes that frequent x-ray flat plates, taken bedside, may help in determining the success or failure of siphonage. The chief field for this method of decompression is in postoperative obstruction which, in a majority of cases, is caused by undue and often unnecessary traumatization of visceral and parietal peritoneum.

How far can clinical surgeons rely on the use of the x-ray as an aid to diagnosis? Schwartz, Case, Kloiber and others have long insisted that the diagnosis of bowel obstruction could be made on the presence of gaseous shadows in the small bowel, the latter always indicating intestinal stasis. It is not always possible to determine whether gas is in the colon or small bowel. We have elsewhere[21], pointed out the possible danger of perforation in the use of the barium enema in the presence of carcinoma of the left colon. In all cases of complete obstruction of the small bowel, the oral administration of barium is to be condemned. A single plate made of the abdomen may reveal the presence of gas, plainly visible in the small intestine if the transverse colon is in its normal position, and corroborate the other findings of intestinal stasis. Wangensteen (loc. cit.) believes it may also determine the degree of distention of the bowel. Where perforation of the bowel, large or small, has occurred, some of the free gas may gravitate beneath the diaphragm and be recognized roentgenologically (Vaughan-Rolnick).

The generally accepted possibilities of the x-ray as a means of confirmatory diagnosis may best be stated in the words of our Roentgenologist at the Ravenswood Hospital, Dr. David L. Jenkinson. In his opinion:

"A plain or 'scout' film of the abdomen will render a considerable amount of information in cases of acute intestinal obstruction *when the physical and clinical information is not complete and well established.* The examination should include the urinary tract and the abdomen with the patient in the supine and upright position and with the patient on his side when necessary. Distention of the intestines with gas and the presence of fluid levels in the bowel often lead to an accurate diagnosis of acute intestinal obstruction with the approximate location of the obstruction. The question of urinary colic with a reflex ileus rather than a mechanical obstruction can often be determined. When the condition of the patient permits and there is evidence that the obstruction may be reflex and not mechanical, intravenous urography may be used to positively exclude the urinary tract. Negative plain films do not necessarily exclude intestinal obstruction, whether acute or partial.

"In partial intestinal obstruction our procedure is as follows: The patient's bowel is completely cleansed by means of enemata and castor oil whenever possible. The pathology in the colon is first excluded by means of a barium enema which is given during fluoroscopic examination so that the filling of the colon may be seen and palpation done. In as many instances as possible the terminal ileum is also filled and examined. An x-ray film is taken of the abdomen after the colon is filled and one immediately after the enema has been expelled. Much additional information can be obtained in certain cases by the injection of air immediately after the barium enema has been expelled. This is especially true where polyps or small tumors which do not alter the contour of the bowel are suspected. If the partial obstruction is not present in the colon, a small amount of barium by mouth may be given followed by three, six and twenty-four hour fluoroscopic and radiographic examinations of the small bowel."

To this very conservative résumé of roentgenological possibilities must be added a few words of warning. In both strangulation ileus and vascular occlusion, the gas shadows appear later than they do in simple obstruction and it would be folly to delay surgical intervention in these fulminating cases. As a means of reducing intussusception in infants, barium enemata have been given by some surgeons. The introduction of air in the colon, under low pressure and manipulation of the intussusception by hand, advocated by A. H. Montgomery and others, is a safer procedure.

Principles of Treatment: In a paper dealing with principles of intestinal surgery, brief mention must be made concerning the handling of intestinal traumata whether occurring in closed or open (gun-shot or stab) wounds. Operation is indicated as soon as a diagnosis of visceral injury is positive, probable or even doubtful. Mesenteric hemorrhage and perforation carry with them a high mortality unless diagnosed and treated as soon as the patient is in a properly equipped hospital. Unless the probability or possibility of severe mesenteric hemorrhage can be ruled out, under no circumstances should such a patient receive cardiovascular stimulation. The mistake, frequently fatal, of stimulating a patient in shock without having previously ruled out or checked hemorrhage is so often made that a few remarks on elementary physiology would seem indicated. In shock associated with or caused by hemorrhage, the cardiovascular system is at its lowest ebb. The pulse is rapid and thin, blood-pressure subnormal and respirations rapid and shallow. Blood issuing from a torn vessel flows more and more slowly and primary clotting occurs. Hemorrhage ceases and remains in abeyance as long as the patient remains in shock. Normal saline, glucose solutions, blood transfusions or cardiac stimulants given hypodermically increase heart action and raise arterial tension. The primary clot is loosened, secondary hemmorrhage occurs and the patient expires. "Stimulate as you clamp or ligate" should be our slogan in hemorrhage cases!

Having decided that surgical intervention is indicated a paramedian incision is made, of sufficient length to enable the surgeon to introduce his whole hand in the peritoneal cavity. Many valuable minutes will be saved if the surgeon has a definite routine for exploration of the abdominal contents. Our preference is to begin at the right upper abdominal quadrant, palpate the right kidney, dome and under surface of the liver, pancreas through the foramen of Winslow, stomach, spleen and left kidney. The gastrocolic and great omentum are next inspected for torn vessels. Passing our right index fingers below the transverse colon, we encounter the ligament of Treitz and begin our inspection of the small bowel and its mesentery. As one loop after another is drawn up and inspected it is returned by the assistant so that undue exposure of bowel, leading to shock, is minimized. At the ileocecal valve we begin our inspection of the colon which is similarly gone over as far as the peritoneal reflection of the recto-sigmoid. Nothing is missed; no perforations or vascular tears remain unrecognized. Ligation of torn vessels, purse-string closure of gun-shot or stab wounds, or resection and end-to-end anastomosis represent the essential steps to be followed. As a general rule, modified by exceptional conditions, each perforation should be sutured before continuing with the systematic inspection of lower loops. Such an exception would be the presence of multiple perforations of a single loop, in which case we double clamp the wounded segment after milking it empty, cover it with a rubber sheet and isolate it before continuing with our search. Where it may seem necessary to eviscerate a number of intestinal loops, David Cheever's method of protecting them is an excellent one. Cheever uses either a large rubber bag or moist rubber dam to cover the intestines with, keeping them warm by means of hot compresses applied against the rubber and not on the intestines. Anybody who has observed the traumatism which exposed bowel is subjected to will appreciate the value of this simple method.

Following repair of perforations or suture of vascular lesions, no drainage of the peritoneum is indicated even if there has been some soiling. For over twenty years it has been our custom in all potentially septic cases to pour one ounce of ether in the peritoneal cavity as we begin its closure; we can see no reason for giving up this phagocytic stimulant and adjuvant to cell resistance[27].

In all cases of strangulated hernia, before deciding for or against resection of an apparently gangrenous loop of bowel, the excellent procedure of Samuel C. Plummer should be carried out. After reducing the strangulation, the involved loop should be replaced in its normal position and allowed to remain there for three to five minutes. By that time circulation, if not hopelessly impaired by thrombosis, will have been restored. We have repeatedly used this most valuable procedure in doubtful cases. Should the patient's condition not warrant immediate resection and anastomosis of a hopelessly gangrenous loop, exteriorization and enterostomy are indicated. The same principles apply to all other types of strangulation ileus.

Should the strangulation be in the lower lieum and have remained undiagnosed for a considerable number of hours, a very high degree of intraintestinal pressure develops. Elmer[24] has pointed out the danger of too sudden a deflation in such cases. According to his theory:

"Post-operative toxemia is probably due to the fact that, while intraintestinal pressure is high enough to interfere with the blood flow through the intestinal wall, an efficient barrier is still present between the fecal content and the circulation; provided, that is, that the pressure is not great enough to force passage through the entire intestinal wall into the peritoneal cavity. According to this idea, then, the intestinal distention for a time at least acts as a protection against absorption of toxins or bacteria. Now, whenever the intraintestinal pressure fails sufficiently, the blood flow through the intestinal wall begins again and there is nothing now to prevent intestinal toxins and bacteria from entering the dilated capillaries."

It is a wise plan, after introducing the enterostomy catheter, to clamp it from time to time and not allow all of the air and fluid content to rush out en-masse. We have all observed the same collapse, minus the toxemia, after removal of large ovarian cysts, dermoids or fibroids.

Where resection is indicated and the patient's general condition is favorable, end-to-end anastomosis is the ideal. Horsley's suggestion to section the mesentery first is a good one; it minimizes the possibility of soiling the mesentery with fecal content. Prior to placing intestinal clamps on the enterostomy site one should always strip or milk that portion of bowel empty.

In simple obstruction, with considerable distention above the band, kink, visceral volvulus, etc., puncturing the most distal segment of paralyzed bowel with a small trocar will be of great help, provided the loop selected is held outside of the peritoneal cavity and soiling of the field of operation is carefully guarded against. As the distention is slowly allowed to subside, a fine purse-string suture is placed around the trocar and tied as the former is removed. Search for and removal of the obstruction is thereby much facilitated.

If the nasal catheter suction apparatus is used, one should know its limitations. It is merely a temporary expedient in mild, principally postoperative, cases of partial obstruction or paresis. Never should it be used in any case where toxemia is the chief danger to the patient's life. Enterostomy, as admitted by Wangensteen, "has one distinct advantage over nasal suction, namely, the opportunity to feed the patient through the catheter as soon as decompression has been effected." Similarly, in carcinomas of the colon where distention is a major factor, McNealy[28] has stressed the advantage of a primary cecostomy. By introducing a catheter into the cecum the distention is relieved and through the same catheter saline or glucose solutions can be given freely. By introducing large amounts of glucose solution the ileocecal valve can be overcome and the glucose made to enter the ileum where it can be absorbed.

In certain types of carcinoma of the splenic flexure or first portion of the descending colon, a transversostomy is indicated as a temporary means of decompression. As an alternative procedure, a temporary ileostomy of the Witzel type may be used for both decompression and feeding purposes. At a later date, usually two weeks or longer, the carcinoma and as much mesentery as possible are removed, the two stumps of colon sutured with the clamps still attached for a distance of eight cm, brought out through the incision and sutured to the abdominal wall. The clamps should remain in situ for 4-5 days. The continuity of the transverse colon is next restored by the Mikulicz technique and the catheter removed from the ileum.

Kerr's technique of aseptic anastomosis has much to commend it. After excising the carcinoma, the two stumps of colon are temporarily closed by means of a silk-worm-gut "basting thread" suture. These sutures are not tied but used as tractors to approximate the segments while they are united by a continuous suture. Once the circular suture is completed, the "basting threads" are pulled out and the bowel is pinched by the surgeon's fingers in order to open the stoma.

In carcinoma of the lower sigmoid we have been using an osteoplastic modification of the Kraske operation which has enabled us to remove the growth, perform an end-to-end anastomosis and thus restore the continuity of the colon. The decompression colostomy should be closed one week later. We have also used, in carcinomas of the rectum, where the sphincter has to be sacrificed, what, for want of a better term, we have called our "corkscrew" operation. After resecting the growth, the sigmoid is mo-

bilized, twisted on its long axis 90 degrees and, in this position, sutured by interrupted sutures to the levator ani muscle. The valve thus formed is quite serviceable after three to four months.

Pre-operatively and postoperatively we give 1000-1500 cc of a 2-5% sodium chloride solution with 50-100 cc of a 50% glucose solution by combined hypodermoclysis and venoclysis.

Dixon of the Mayo clinic[29] has recently reported a lessened mortality from peritonitis through the use of autogenous vaccines. We have had no experience with them.

An attempt to specifically point out the causes of the high mortality which still pertains in cases of complete intestinal obstruction and, more specially, to evaluate the methods which seem to lessen the number of fatalities, is a well-nigh impossible task: Any surgeon having a considerable number of such cases referred to him will, as he gains more and more experience, see his mortality rate diminish. All surgeons agree that delayed diagnosis on the part of the family doctor and hesitancy on the part of the patient, raise our mortality rate; also that attempting to do more than the individual patient can withstand, shows poor judgment. It was hoped that our better knowledge of the perversion of blood chemistry in acute ileus might considerably lower our mortality rate. Contradictory reports becloud the situation. Amendola[30], analyzing all cases of intestinal obstruction brought to the Roosevelt Hospital (New York) from 1921 to 1935 states that: "Since 1928, large quantities of salt and fluids before and after operation has become a standard procedure. The anticipated improvement in our results, however, has not materialized. In the seven years prior to 1928 we had 115 cases with 41 deaths, or a 35.6% mortality. Since 1928 we have had 85 cases with 28 deaths or a 32.9% mortality. The average clinical case of acute ileus, he says, presents problems which are quite different from those encountered in the experimental animal." In his opinion, the administration of large quantities of salt solution preoperatively and postoperatively has had no appreciable effect on our mortality in acute intestinal obstruction. He warns against resection of gangrenous intestine with primary anastomosis in a patient afflicted with acute intestinal obstruction. We fully agree with him when he says: "In view of the frequency in which intra-abdominal strangulation is encountered and the difficulty of differentiating it from simple occlusion, any undue delay in operating is not justifiable. Conservative procedures such as the prolonged administration of salt solution and duodenal intubation, however, are of distinct value in the simple obstruction associated with an early plastic peritonitis and may be employed with advantage (possible), in the markedly advanced cases of ileus in which immediate surgical attack is too hazardous.

Meyer and Spivack[31], reporting on 505 cases of intestinal obstruction admitted to the Cook County Hospital, stated that only 292 of them (57%) were operable. Of the remaining 213 cases, a few left the hospital after refusing operation. Of the cases operated on, 142 died, giving a mortality of 48.6%. That the death rate will always be higher in public hospitals is conceded. In private practice we still lose between 25 and 30% of similar cases.

Moss and McFetridge[32] collected the histories of 511 cases of intestinal obstruction from the records of the Charity Hospital, New Orleans. They claim that their early high mortality of 71% has been reduced to 31.7% and attribute the improvement to: "the use of the proper preoperative preparation, chiefly directed toward the correction of perverted blood chemistry, by the restriction of surgical procedures to those directed only towards the relief of obstruction, etc."

SUMMARY AND CONCLUSIONS

1. In the presence of a case of intestinal obstruction, of closed or open trauma of the intestinal tract, preserve a judicial attitude and avoid hasty deductions. "Festina lente," make haste slowly, is a good anchor to grasp!

2. All intestinal lesions associated with active hemorrhage or circulatory strangulation demand immediate surgical intervention.

3. Many cases of partial intestinal obstruction, and particularly those following laparotomies, only need decompression via per-nasal gastroduodenal siphonage in order to be permanently relieved.

4. In the presence of strangulation obstructions no more should be done than the patient's condition warrants. It is here that surgical judgment and experience count the most. Release of the obstruction with restoration of the

continuity of the intestine is, of course, the ideal. This procedure may be simple and rapid, a mere cutting of a constricting band, or it may involve resection and end-to-end anastomosis. A rapid enterostomy with exteriorization of the strangulated loop will save the patient's life; at a later date resection and anastomosis becomes a relatively safe procedure.

5. While not denying the confirmatory value of the laboratory and x-ray department, the surgeon whose own senses (sight, hearing, palpating) are constantly on the alert, will make the fewest mistakes in diagnosis.

6. Whatever decision the surgeon may arrive at, in the course of his intervention he should at all times be ready and able to individualize his technique to suit a particular situation. Finally he should constantly work "suaviter in modo, fortiter in re," gently in the manner, firmly in the act!

7. A clear understanding of the mechanical and physiochemical factors involved in intestinal obstruction should enable the general practitioner to make earlier diagnoses; in prompt intervention lies the only hope for any considerable reduction in mortality.

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DISCUSSION

Dr. Carl E. Black, Jacksonville, Illinois: I am sure you have been benefited by this paper and have been given an idea of what a great number of complicated problems the gastrointestinal tract brings to the surgeon. For years after the introduction of aseptic surgery, surgeons were occupied in devising new operations and working out details of technic. Today our study has turned back to the patient. Our diagnosis may be correct and we may be satisfied as to the operative procedure indicated, but still we may not be able to make an operation. This makes the difference between "operators" and "surgeons"—operators are many, and surgeons are few. The surgeon will not operate until he is satisfied that every detail, consistent with the patient's condition of pre-operative care, has been carried out to reduce the operative risk to the minimum. Avoid all undesirable haste, although the attending physician, patient or friends may urge immediate operation.

There are several factors which affect the end result which are not under the surgeon's control: First, delay by the patient in calling the physician or in accepting his advice; second, delay by the attending physician in making a diagnosis, in urging prompt action, or in placing before the patient and his family what is involved. There are also several factors which are under the surgeon's control: Too much haste on insufficient grounds; inadequate study of the case, including physical examination, laboratory tests, and evaluation of the patient as an individual risk; due attention to the various means of postoperative support which favorably modify the immediate period following operation as well as the period of convalescence.

The danger signals in acute abdominal infections are also the surgeon's affair: the board-like abdomen, the distention; the presence in the urine of albumin or casts, or both, acetone and diacetic acid; the low kidney function. All or several of these may be present. There may be heart disturbance or disease, lung dis-

turbances or disease, such as bronchitis, pneumonia, tuberculosis, pleuritic effusion or emphysema. In fact, every condition present must be given due consideration before proceeding with any intraabdominal procedure.

The essayist has brought out the fact that too little attention is being given to the physiological relations involved in operations on the intestinal tract. In fact, here is a great field for study. We need many more facts about the interaction of the intestinal secretions and their relation to nutrition and to tissue metabolism. The essayist used one sentence which covers a most important consideration, when he spoke of the "reintroduction of fluids from the upper intestinal tract into the lower intestinal tract." In connection with a recent case I had occasion to make a rather extended search for information which would be practically helpful on this point. While a great deal of work has been done on the physiology of digestion, there remains much to be done.

Some months ago, a woman 58 years of age, married, was brought to the hospital in a very precarious condition on account of what seemed to be acute intestinal obstruction. Going back into the history of the previous eight months, it was perfectly plain, however, that this patient had had recurrent attacks of partial obstruction which would be relieved by liquid stools before the obstruction became complete. She had been more or less of an invalid, and finally arrived at the hospital with all the signs of complete obstruction. If a patient has complete obstruction, there is only one thing to do, that is, relieve the obstruction. Therefore, after giving her intravenous glucose prior to the operation and continuing it on the operating table, the abdomen was opened and revealed complete obstruction due to a fecalith about the size of a hen's egg. The gut was incised and fecalith removed. A large catheter was introduced through a stab wound in the distended gut about six inches above the obstruction and after observing the circulation in the gut for a time, the gut was closed. The obstruction was in the lower third of the jejunum. Owing to the lowered vitality of the patient, the wound opened up and we had a fecal fistula. While for a time the patient improved, we were never able to reestablish proper intestinal digestion. We tried injecting fluids, bile salts, pancreatic salts, etc., into the lower intestinal tract, siphoning fluids from upper end and injecting it into the lower end and connecting the two ends of the fistula with glass tubing, hoping a normal mixture of intestinal fluids could be secured. I think we would have succeeded had it not been for the prolonged period of poisoning by lack of proper intestinal fluids. I consulted all the literature available and I must say that I got very little help. It seems to me that there is a physical problem of digestive absorption, and the problem awaits solution by somebody in the future. I take this opportunity to put this case into the record because it covers the point the essayist made, namely, that the absence of fluid from the upper intestinal tract in the lower is a very serious thing—no doubt mixing these fluids is essential. In this case blood transfusions, intravenous glucose, putting glucose into the colon accomplished nothing. The patient finally died from some form of toxemia, malnutrition, or what you will, due to failure of proper intestinal fluid mixture. Here is a physiological problem to be worked out.

Dr. George de Tarnowsky, Chicago (closing): I had a somewhat similar case a number of years ago. The obstruction was caused by a large gallstone which had evidently perforated into the colon. In that case the patient came to me with a paralytic ileus. This patient also succumbed.

CATARACT SYMPOSIUM

INTRODUCTORY REMARKS

OSCAR B. NUGENT, M. D., Chairman

CHICAGO

Nearly 200 years ago in Europe there began a controversy between two great schools of thought concerning the proper method of cataract extraction: The capsulotomy method, first performed by Daviel, and the intracapsular method advocated by Samuel Sharp. The former has held the stage until within the last few years since which time the latter has been accorded a goodly share of attention.

The subject of cataract extraction is a tremendous one. In a territory in India, comprising but six provinces, or about two-thirds of the total area, there were performed, according to Col. Smith, 1,348,358 cataract extractions from the years 1881 to 1924 inclusive. If the same number only had been performed the subsequent ten years as the preceding ten, the number would be 1,811,573.

The present status of cataract extraction in the world has been created, in a large measure, by the works of the ophthalmic surgeons of the past, and that of the future will be greatly influenced by the works of the present day ophthalmic surgeons; therefore, what will be said here today will, in a measure, influence the future operation for cataract extraction.

Those surgeons who have given this subject much study and thought realize more than others the high position that modern methods of cataract extraction has attained.

I would like to stress three points in these few general remarks:

1. The importance of delivering a lens

Read before Section on Eye, Ear, Nose and Throat, Illinois State Medical Society, May 21, 1935, at Rockford.

through a dilated pupil in order that there will be a round active pupil following the extraction. Four advantages are to be noted: (a) better results following the use of eserin immediately following extraction; (b) lessened danger of postoperative hemorrhage into the anterior chamber; (c) a round active pupil for the more normal control of light entering the eye; and (d) a more perfect cosmetic effect.

2. Multiple tension sutures to insure greater security in closing the wound. The average conjunctival incision in a cataract operation is from 20 to 22 mm in length. My custom is to use about 9 sutures about 2 mm and a very small fraction apart. The sutures are of the finest silk thread and are placed as near to the limbus as possible and then carried well up into the bulbar conjunctiva so that when they are tied there is a slight tension which is slightly increased during the subsequent swelling and assists in holding the cut edges of the sclera well into the proper apposition. The danger of leakage from the wound is lessened and iris prolapse and incarceration are reduced to a minimum. Healing is more rapid and more secure and the dangers of hemorrhage into the anterior chamber from cut scleral or conjunctival vessels is greatly reduced.

3. A carbon arc lamp with a filter producing a ray rich with violet and ultraviolet which causes a bright fluorescence of the lens cortex. (This lamp has been described by Rommel Hildreth of Saint Louis.) Its value cannot be overestimated in capsulotomy operations and attempted intracapsular operations resulting in broken capsules, for working under its light, the anterior chamber can be completely cleared of all lens cortex, whether it is filled with the opaque substance or perfectly clear, and in most cases the capsule is so plainly visible that it can also be extracted from the eye with a forceps resulting in a complete extraction.

I am working with the Bausch & Lomb company now attempting to design a practical lamp of this sort to be used by the ophthalmic surgeon which I believe will be described in the literature in the near future. It is one of the most valuable of recent additions to our armamentarium for cataract extraction.

WHAT THE SLITLAMP SHOWS

ROBERT VON DER HEYDT, M. D.

CHICAGO

1. *Senile Cataract of the Lens Cortex.* The most common type of senile cataract is that in which one finds supranuclear cortical changes in the form of radial and concentric fissures. These fissures, when incipient, are filled with fluid. Lenses may incline to radial or to concentric fissure formation, or there may be a combination of the two types. The incipience of this process is a characteristic picture under the slitlamp. Radial fissures are usually an involvement of the radial lamellae of Rabl. In their incipience they present a black area in the narrow beam of the slitlamp. While these areas predict a threatening opacification, the process may remain thus stationary for many years. If one finds gray spokes visible with the ophthalmoscope, and no evidences of threatened progression (fresh fissure formation) with the slitlamp, one may presume that the development of this cataract is at a standstill, possibly permanently.

Lenses may also show a disposition to fissure formation in a concentric (lamellar) direction. These, when fully advanced, present the well known dark plaques seen in the lens with the ophthalmoscope. While they are fissures in a concentric direction, they are not splittings along definite anatomic lines. The fibers are too intermingled to allow of this along smooth concentric planes. This type of splitting in its incipience (invisible with the ophthalmoscope) shows a most characteristic slitlamp picture. There are so many fibers crossing the fissure (from one lamella to another, if it may be so designated) that these form a wavy design which outlines the area of concentric separation. The wavy lines parallel to each other are due to rows of fibers belonging to a single lamella bridging the separation at right angles to the direction of the fibers. This I believe to be the explanation of this wavy, combed-like appearance, which to slitlamp observers heretofore has seemed inconsistent with or inexplicable on the basis of anatomic lines or of direction of fibers. It is of utmost

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clinical importance that the use of the slitlamp has given insight into this most interesting phase of progression in the development of cortical cataract.

It is not fully understood why lenses show this tendency to fissure formation in the cortex. There have been varied attempts at explanation, such as excessive contraction of the nucleus, retardation in the development of new lens cortex and traction of the zonule fibers.

In certain lenses the nucleus, because of its weight, behaves as a foreign body and, because of a softening of the cortex, gravitates within the capsular bag (morgagnian cataract). In view of this and the fact that relaxation of the zonule fibers in efforts at accommodation still continues at this period of life, it is believable that this constant trauma of the weight of the nucleus on the cortex may initiate the changes. This, in a way, would explain why the incipient lesions of this type are almost always first seen below and on the nasal side.

2. *Senile Nuclear Sclerosis.* The type of senile cataract is determined in a great measure by the degree of sclerosis present in the whole of the lens. When the sclerosis is quite advanced the cataract is of the type known as "nuclear sclerosis," because of the greatly increased density of the nucleus. This increased nuclear density is sharply delimited so that at times there may be a lens within a lens, or one with two foci. The lens presents a very differnt focus through its periphery than through the middle.

In many cases the nucleus may be dark red or even black (cataracta nigra). In these cases there is the same abrupt contrast between the color of the nucleus and that of the cortex. The latter is absolutely colorless. Much to my surprise, I have found cases of this type in which the process was extreme in one eye and there was little coloration of the nucleus in the other. The excessive sclerosis of the lens nucleus in these eyes often causes them to acquire an increase in their refractive power. It is this change that brings on a myopia in an emmetropic person and enables him again to see near objects without glasses (second sight). It is a process of conservation unless the sclerosis becomes excessive and thus reduces the visual acuity by impairing the tranparency of the lens. In uncomplicated nuclear sclerosis, the cortex of the lens is usually free from changes.

3. *Toxic Cataract* (*Cataracta Complicata*). An extremely common type of lens involvement in middle life is that known as toxic cataract or cataracta complicata. Ophthalmologists are familiar with it because of its frequent occurrence in conjunction with retinal detachment, myopia, choroiditis and other degenerative conditions of the eye. It is surprising how often it is found in eyes that fail to show any other pathologic processes. In these one may suspect a low grade choroiditis or some other toxic etiology. A very slight involvement of the lens constituting a serious threat to central vision is a common slitlamp observation.

Its incipiency is characteristically seen under the posterior capsule as a green and red iridescence, possibly due to a thin flake formation or to a slight separation of the lens from the capsule. Its extension is at first subcapsular toward the equator, and then it progresses forward through the lens substance. The slitlamp picture at this stage is most characteristic: a porous asbestos-like change. Here and there one may see vacuoles. When the cataract is quite advanced posteriorly, similar iridescent incipient changes may be seen subcapsularly at the anterior pole of the lens. Owing to its central (polar) position, even a moderate involvement may greatly reduce visual acuity. The vitreous, as may be seen with the slitlamp, is more fluid.

There is no doubt that this common form of cataract is due to an absorption of matter toxic to the lens. The anterior capsule of the lens at the pole at this time of life is about five times as thick as is the posterior capsule, and, in addition, is covered by a protective layer of epithelial cells of equal thickness. The greater permeability of the capsule at the posterior pole, therefore, predisposes that area of the lens to early toxic changes.

The characteristic slitlamp evidences of the incipience of toxic cataract give ample warning. Therapeutic elimination of the constitutional toxic factor may inhibit progression of the cataract.

PREOPERATIVE PREPARATION AND ANESTHESIA FOR CATARACT EXTRACTION

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The operation for removal of cataract is the most important, most serious and most frequently done in the whole range of ocular surgery. Its success or failure means much to the patient. In the one case, sight is restored and the happy patient goes about his business as usual; in the other, vision is lost and an unfortunate individual becomes a helpless burden to family or state.

Preoperative preparation for cataract extraction should be started when the diagnosis is made; if not at that time, then shortly thereafter. Cultivation of the proper mental attitude is as important as the physical preparation.

Old age is not a contraindication to operation. I have operated upon patients past 90 years of age with good results. In spite of the fact that cataract extractions are usually successful, and also that this is generally known, I know of no disease more dreaded than cataract. The mental shock accompanying realization that one has a cataract can not be measured. Therefore, one should spend enough time with a patient to assure him that the outlook is not hopeless; that operation can be done without pain and offers an excellent chance for restoration of vision. Every effort should be made to inspire the patient's confidence. Kindly assurances will do much to quiet normal fears. But always, the question arises: Shall we tell a patient he has a cataract? Kindly and tactful explanations to the patient will usually handle this situation, I believe. For many years I followed the custom of telling some member of the patient's family the true condition, but I do not now believe that this is good practice. In any event, if the patient is not told the true condition, sooner or later another oculist will be consulted and will inform him or some member of the family will impart the information in a garbled, exaggerated manner which will destroy that confidence so necessary between patient and physician. I now make it a point to tell the patient myself. The patient should feel that he wants the operation done, and should not be talked into having it done. A patient fully confident that he will experience no pain, that he can rely on the judgment and ability of the surgeon, and can expect a good result, will invariably act well at time of operation. Occasionally, of course, this does not work so well. For example: Recently, an old patient and friend of mine came to me because of "slight loss of vision, and spots before her eyes." Examination revealed rapidly developing cataracts in each eye. Refraction brought vision to practically normal, and the question then arose as to what and how much to tell this patient regarding the true cause of her condition. I frankly told her the true state of affairs, as kindly and gently as possible. Because she was an old patient and acquaintance, I felt that I could do this. To my amazement, she broke down completely, and on a number of occasions threatened to commit suicide, and I believe would have done so if her family physician and I had not kept her under constant observation. After many conferences, explanations and assurances she finally accepted the situation in a philosophical manner, and is looking forward to the time when, if she does become blind, operation will relieve her.

One presupposes that the immediate preparation for any operation shall include a complete physical examination. Removal of teeth infected at the apex is surely indicated. How much dental treatment is necessary if alveolar disease is present is debatable; this should be left to the judgment of a dentist. It is important that a complete examination of the lungs be made because of postoperative dangers incident to chronic coughs. Complete examination of the urine should also be made. If sugar is present it must be eliminated before operation, either by diet or by the use of insulin. If a true diabetes is present, the patient should be kept pretty well insulinized before operation and during convalescence. Gross sinus infection should be cleared up as nearly as possible. I do not pay very much attention to the tonsils because my experience has taught me that one seldom, if ever, is able to distinguish between a normal and abnormal tonsil in so far as chronic infection is concerned. Those who have frequent tonsillitis should have

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a tonsillectomy. Hypertension is a real menace so far as operative and postoperative complications are concerned. If the tension approximates 200 systolic and over 100 diastolic, one pint of blood should be removed immediately prior to operation. This will usually keep the pressure down during convalescence.

Preparation of the eye should include a thorough slit-lamp study and estimation of intraocular tension. If chronic glaucoma is present, a preliminary iridectomy should be done, or some other type of operation to reduce tension. It is an excellent plan to apply a test bandage some days before operation. I believe this gives as much, if not more, information regarding sterility of the conjunctival sac than do cultures. However, I always have a culture made the day before operation, and if pyogenic organisms are present in appreciable numbers, operation is deferred, and the conjunctival disease treated. Purulent dacryocystitis calls for operation. Chronic conditions of the gastro-intestinal tract, and diseases of the kidney should be cleared up in so far as possible. However, it is well to remember that many of these conditions are incurable and will not as a rule offer a serious barrier to operation.

Hospitalization is desirable. At various times I have operated in the home; never in the office. The patient should be in the hospital at least twenty-four hours before operation, and if possible, forty-eight hours. The strangeness of hospital routine is severe on elderly people generally, and it is well to have them accustomed to changed surroundings before bandages are applied. A full tub bath is desirable, though not essential. The hair and scalp should be thoroughly scrubbed, and, of course, the entire face cleansed the day before operation. At this time the eyebrow is shaved and the eyelashes clipped. A 25% solution of argyrol is instilled into each eye every four hours, except at night, during the twenty-four hours preceding operation. The night before operation 2 grains of phenobarbitol are given, and two hours before operation one grain of phenobarbitol is given, repeated in one hour. Recently, I have been using allonal and I like it better than phenobarbitol, as the action is more prompt and does not last as long. Opium derivatives are not used because of the danger of vomiting. Evipan has been recommended as a preliminary. I have not used it. Morphine and hyoscin in combination has been tried but its action can not be relied upon. I operate in the regular hospital operating room on an ordinary table used for major surgery. There may be some objection to transferring a patient from a cart to the operating table, and back from the table to the cart and to bed, but I have never had an accident as a result of this procedure. I believe, however, it would be more desirable to have a special bed which could be used as an operating table, and from which the patient need not be moved. It is well to have accustomed the patient to the use of a speculum by inserting one on several occasions before entrance to the hospital.

Nothing should be done to a patient with very poor vision, or one who is blind, without first telling him exactly what one is going to do, and one should repeatedly assure the patient that the operation will be painless.

Anesthesia and Preparation of the Field. Much has been said and written regarding types of anesthetics. Cocaine has always served me well; I have never seen an untoward reaction from its use, and until I have some excellent reason to change to another drug, I shall continue to use it. Too often we use new types of anesthetics simply to try them out. I consider that complete and perfect anesthesia is one of the most important features of this operation. An outstanding contribution to the success of the operation is the development of akinesia. Immediately upon arrival on the operating table, the 7th nerve is blocked according to the method described by O'Brien. If from 3 to 5 cc. of novocain are used for this purpose, akinesia never fails to appear. I prefer the method of O'Brien to that of Van Lint, because there is no danger of lid edema to cause operative complications. A 5% solution of cocaine, previously sterilized by boiling, is instilled into the eye four times at three-minute intervals, and with the last instillation a drop is instilled into the other eye. Following the last drop of cocaine several drops of 1-1000 adrenalin are used. Immediately over the insertion of the superior rectus muscle two drops of novocain are injected for the bridle suture, and immediately before operation 1.5 cc. of novocain with 1-100,000 adrenalin is injected into the retrobulbar region of the orbit through

the lower lid. Scrubbing the area with soap and water has been discontinued except on the day prior to operation. Two-thirds of the face is painted with tincture of merthiolate up to and including the roots of the eyelashes. The conjunctiva is flushed with 4% solution of boric acid. No other chemicals are used. Immediately after the corneal incision, the flap is lifted and one drop of sterile cocaine is instilled into the anterior chamber.

General anesthesia is rarely required. However, if occasion arises for its use, I have found avertin as a basal anesthetic, supplemented by nitrous oxide, very effective. It should rarely be used.

Preparation of Instruments and Operator. All instruments used in the operation, including the cataract knife, are boiled in triple distilled water. I have found that boiling does not dull the edge of the knife. If sterilization of sharp instruments by other methods is effective, then why not sterilize all instruments in the same manner? The surgeon should wear sterile gown, mask and cap. There can be no real objection to the use of sterile rubber gloves. Well-fitting thin gloves do not alter the sense of touch, and the only answer to objections to their use is to ask: "Would one permit his abdomen to be opened by a surgeon who did not use gloves?"

The patient's entire body should be covered with a sterile sheet, the head resting upon a sterile table cover. I then use a sterile sheet 3x3 feet in size in which a fair-sized opening has been cut and hemmed. The opening in the sheet is placed over the eye, the patient's head raised and the sheet tucked beneath the patient's head and neck. This insures a sterile operative field.

Every effort possible should be made to have the operating room, instruments, operator, and assistants completely ready for operation before the arrival of the patient. I have seen much needless fussing and fuming in the operating room due to last minute preparations, after the patient's arrival. To say the least this does not contribute to the proper frame of mind of either patient or operator. Loud talking, clanging of pans and moving things about in the operating room disturb the tranquility of both patient and operator. Absolute silence must be maintained, and only the surgeon should converse with the patient.

Again I wish to emphasize the importance of keeping the patient fully informed of what is going on and just what to expect at all times, and nothing should be done about the eye without first telling the patient what to expect.

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CATARACT INCISION, IRIDECTOMY AND IRIDOTOMY

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There is insufficient time in this symposium to give a complete history of the origin and gradual development of the incision which is the subject of this paper.

Couching for cataract, or depression, may have been practiced centuries before the dawn of the Christian era, although the first description of the operation is credited to Celsus. History records several instances of the lens having been removed from the anterior chamber following attempted depression.

Daviel about the middle of the 18th century (April 8, 1747) was perhaps the first to attempt extraction of a cataract situated in its normal position. A few years later Sharp of London used a narrow, sharp-pointed knife curved like a bistoury. A century later Von Graefe devised his narrow knife with parallel cutting edge and back. The incision first advocated by him would almost always allow the iris to become incarcerated in the wound. After a couple of years' practice, he changed the point of puncture and made a virtue of the necessity of iridectomy by advising a wide iridectomy. His "modified linear extraction" soon became a standard for the great mass of surgeons.

The incision, at first made in the lower half of the cornea, was soon changed to the upper section because the firm pressure of the upper lid and the concave cartilage acted like a splint in covering the incision, keeping the wound margins approximated, with less gaping and consequently less danger of infection.

The incision originally made almost wholly in the clear cornea, sometimes only a little above the center, separated a large area of nonvascular tissue from its nutritive supply. More recently

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there has been a tendency to make the incision toward the limbus, or entirely outside the clear cornea, but concentric with the limbus. This location gives a longer, freer opening, nearer the nutritive vessels, and the conjunctival flap, which is quickly agglutinated, utilizes the best protective tissue to close the wound promptly and to prevent displacement of its margins. A well placed incision has much to do with the success of the operation, although skill and experience frequently effect a good ending in spite of a very bad beginning. It is essential to have good light, good vision, a good knife, and a steady eyeball. The eye in the orbit has one point fixed, namely, the center of rotation of the eye. To prevent rotation of the eye two more points should be fixed. This can be done by the double fixation forceps, by two fixation forceps, or by one fixation forceps and a bridle stitch through the superior rectus. The stitch is of great value in rotating the eye downward.

The size of the incision is important; a large incision is less dangerous than one too small. The length of the cut is sometimes varied, the younger patient having a smaller cut than the older patient who requires a more extensive opening to allow for the extraction of the larger nucleus.

The various methods of intracapsular extraction usually require a slightly larger incision, as a small incision tends to rupture the capsule. The incision may even embrace one-half of the corneal circumference to allow for more freedom of manipulation.

Either episcleral or scleral fixation may be used. In the episcleral fixation, forceps with slightly dulled teeth should be utilized. The intent is to obtain a firm hold not too near the cornea. The forceps should be opened 5 or 6 mm., held perpendicular to the eye 1 mm. from the lower limbus, and a strong pressure be effected in order that both the conjunctiva and the episcleral tissue may be grasped. Then a test should be made to see that a firm hold has been obtained. If the conjunctiva only is seized, it is very easily torn.

The scleral forceps are used to enter the sclera. They are opened only 2 mm. and are placed near to the limbus; they are pressed firmly and closed at the same time. They give a perfect fixation. Tilting the handle of the forceps as far as possible toward the nose makes less strain on the delicate conjunctiva. Then resistance to the thrust of the knife is made, not by pulling but by pushing.

Jackson says the tendency to push the eye around by the forward thrust, is best controlled by placing the fixation forceps just below the point chosen for the counterpuncture. A good section should lie just posterior to the limbus and in the conjunctiva throughout its length.

The conjunctival flap should be about 1 to 2 mm. wide at its narrowest part—i. e., the point of puncture and counterpuncture—and 4 to 5 mm. at the summit. Usually for the intracapsular extraction, the summit is less, or it may even end with the incision in the cornea itself. Generally the incision is begun about 1 mm. above the horizontal meridian. The knife is started 1 mm. within the border of the limbus and is directed toward a corresponding point on the nasal side but 1 mm. inside the clear cornea, which brings the counterpuncture 1 mm. within the border of the limbus. Most men advance the nasal incision more on the thrust and endeavor to complete the incision with the heel of the knife on the pull, or at least complete the scleral cut in these two movements. After the severance of the sclera, the edge of the knife is turned forward to finish the conjunctival cut with as much or as little flap as may be desired. If a corneoscleral stitch has been placed it will be necessary to come out exactly between the two parts of the stitch, which is not difficult if the last conjunctival cut is made slowly. A pause in carrying the knife across the anterior chamber may allow the iris to fall forward with the escape of the aqueous, and the knife may penetrate a few fibres or even the entire thickness of the iris.

It is better to complete the incision than to attempt withdrawal unless it is intended to postpone the operation for a day or two. An incision too near to the ciliary body causes almost immediate pain and bleeding more or less severe. Sudden bleeding with a normal cut is usually due to the fact that the patient has stopped breathing and is holding the breath. Corneal incisions do not heal as readily nor as early as those made in the limbus. The corneal wound may reopen or remain open long enough to permit an ingrowth of epithelium that may

spread over the entire anterior chamber and lead to secondary glaucoma.

Various forms of conjunctival, scleroconjunctival and corneoconjunctival sutures have been enthusiastically described and employed by various operators abroad and in this country. Each of the various forms of suture is made with the same object in view, namely to lessen the danger during operation and prevent opening of the wound subsequent to the operation. One author enumerates the advantages of the scleroconjunctival suture as follows:

1. In loss of vitreous, it allows immediate secure closing of the wound.

2. In impending loss of vitreous at any stage after the section, it permits the operator to keep the wound open as widely or as little as necessary in order to complete the operation.

3. It enables one to clear away all the visible lenticular debris with safety.

4. It secures immediate and firm coaptation of the wound as soon as the suture is tied.

5. It favors quick reestablishment of the anterior chamber, and reduces chances of secondary prolapse of the iris.

6. It is valuable in postoperative delirium or vomiting.

7. It permits prompt healing with less scar tissue and less astigmatism.

My own observations have led me to believe that the average operator, in placing a corneal suture after the incision, incurs a greater risk from trauma and repeated attempts than by the omission of the suture.

Single or double suture of the flap, loosely tied and laid aside, seems the more general custom. It is only fair to state that prolapse does occur at times even with sutures.

Knapp reporting his fourth hundred successive intracapsular extractions, favors a broad limbal incision with a conjunctival flap. He does not use a suture, because he is not convinced that it would help in this type of operation. Statistics of vision, for example, 6/10 vision, do not explain that one patient has good vision of 6/10, while another has 6/10 with disagreeable lights and annoyance, due to coloboma and destruction of the sphincter.

In the treatment of the iris three things should be remembered:

1. The pupil should be large enough to permit the passage of the lens. This sometimes requires that the sphincter of the iris be cut, but usually cocaine and adrenalin dilate the pupil sufficiently. Safar thinks homatropine is essential, others use euphthalmine. If the iris remains intact this is the so-called simple extraction.

2. The iris should be treated so as to prevent a prolapse. A complete iridectomy does this, while at the same time, it provides a large pupil for the passage of the lens. A basal buttonhole, peripheral iridectomy which does not cut the sphincter is even better as a preventive of prolapse, but worse than useless as an aid to the passage of the lens.

3. For the best results the pupil should be round, central and active.

The peripheral iridectomy meets fully the second and third requirement, while frequently the sphincter must be cut to satisfy the first.

Peripheral iridectomy has but one indication, namely to avoid a prolapse of the iris. For example, a case without iridectomy, one or two days after the operation, by a sudden increase of pressure due to coughing or straining causes the wound to open suddenly; the tendency is to relieve the situation by the route of least resistance. The aqueous will not pass around the iris, but moves by the direct route and carries the iris with it. With peripheral iridectomy, the posterior chamber empties through this small hole.

Chandler of Boston was one of the first men to do the buttonhole peripheral excision, but Hess popularized it. In performing a peripheral iridectomy, the Hess forceps opened about 1 to 2 mm. should be applied perpendicularly into the wound and closed on the iris. The forceps are then withdrawn and the iris incised close to the forceps. It is necessary not to cut too deeply lest a total coloboma be produced.

If the complete iridectomy is decided upon the excision of the iris should be made as slender as possible. A small coloboma averts prolapse of the iris as certainly as does a large one, and causes less confusion from dazzling. If the pupil is not round, the operator should replace the iris, then enter with slender iris forceps, open 2 mm. or less, and close, grasping the iris not at the very margin as this is too friable, but back 1 or 2 mm. where the stroma is firmer. He

should pull it out and as soon as the iris can be seen, cut close to the forceps and at right angles to the corneal incision. In replacing the iris, the spatula should lie parallel to the surface of the iris at all times. The edge of the spatula turned toward the iris holds better than the flat surface. The operator should stroke the iris gently from the periphery toward the pupil, removing the instrument from the side and being careful to touch neither the anterior surface of the vitreous nor the posterior surface of the cornea, as this may result in prolapse of the vitreous or a cloudy cornea.

Gradle, reporting two hundred extractions divided evenly between extra and intracapsular methods, performed an iridectomy in all but one case. The following table is taken from his report:

TYPE OF IRIDECTOMY

Operation	Extracapsular	Intracapsular
None performed	0	1
Preliminary	25	8
Complete	70	46
Peripheral	5	45
Total	100	100

Preliminary iridectomy was performed in cases where useful vision was impaired and where there was unduly slow progress to surgical opacity—also in cases of bad surgical risk from lack of self-control. Elschnig makes a small peripheral iridotomy at 12 o'clock with DeWecker's scissors.

O'Brien says for the usual uncomplicated case, peripheral iridotomy or iridectomy is just as efficient in preventing prolapse of the iris as is complete iridectomy and the cosmetic result is much better. If an iridotomy is performed there is not so much liability of incarceration of the lens capsule in the wound. If the sphincter muscle of the iris has been relaxed, and the iridotomy is small and peripherally placed, there is practically no danger of rupture of the iris during the extraction of the lens. In making the iridotomy the anterior flap of the wound is lifted with fine forceps and the iris exposed to view, then with sharp, pointed scissors, a small snip is made in the upper iris periphery. One must not go too deep with the point of the scissors, otherwise the anterior border layer of the vitreous may be opened and a vitreous prolapse may ensue.

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SENILE CATARACT

W. A. Fisher, M. D., F. A. C. S.

CHICAGO

That part of the symposium dealing with the removal of senile cataract within its capsule by pressure, as in the Smith method, or some of its modifications, or by the suction or Barraquer method or some of its modifications, has been assigned to me.

I will assume that all operators prepare the patient in practically the same manner. Complete anesthesia of the eye is affected and the incision made in quite the same manner whichever method of removal of the cataract is selected.

Some prefer a corneal incision; others a conjunctival flap. Some insert two or more conjunctival sutures while others do not use sutures.

If approached in the proper manner and enough time is given to the technic, the removing of a senile cataract by any method can be mastered, because material for obtaining practice in operative technic is plentiful and easily obtained. To master the technic, one method would be to witness many operations; but merely observing a good operator and not operating would

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be quite like watching a good pianist and not practicing.

When operating for cataract by any method, it is imperative that lid pressure, as far as possible be removed from the eyeball, and this is best accomplished by the use of lid hooks.

Some operators prefer a full iridectomy; others a small peripheral iridotomy. One of the two is imperative and should be done before inserting the conjunctival sutures. Those who prefer a full iridectomy use 1%. atropine, two times, one-half hour apart, the night before the operation and one installation on the morning of the operation; no atropine is used after the operation. Those who prefer a peripheral iridotomy use 5%. euphthalmine in 5%. of cocain ointment until dilatation is obtained. The preparation of the patient is begun about one hour before the operation, and the operation is performed as soon as the pupil is fully dilated. When the operation is finished 0.5%. eserine ointment is spread between the lids to contract the pupil.

Smith Technic: Removal of the lens by the Smith method is accomplished by pressure upon the lower edge of the cornea and Figures 1-2-3-4-5-6-7-8 describe the technic better than words. Complications will be discussed by others.

Suction Practice: One can become quite skillful by practice as described in Figure 9.

The end of a large spool is covered with black cloth and a round hole made in the center. A piece of transparent cloth is placed over the black with a slit to represent the incision. A thread is inserted to represent a conjunctival suture and looped for exit of the lens. A hole in the spool is filled with cotton to within one-quarter inch of the top. On top of the cotton is placed the lens of a freshly-killed chicken.

The edge of the incision (Fig. 9) is picked up with Nugent's forceps, exposing the chicken's lens, and the suction tip is placed evenly upon it without using any pressure. The operator's tongue is placed on Nugent's oral valve (C) giving suction and causing the lens to adhere to the suction cup. The suction cup should remain in contact with the lens for about eight seconds before any traction is made. When the lens is dislocated below and comes forward the suction is released, by removal of the tongue from the oral valve (Fig. 10) and the operation

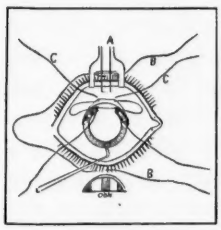


Figure 1.

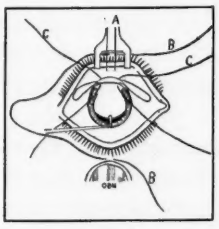
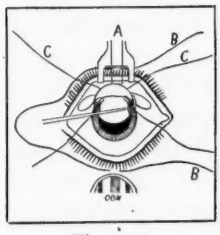


Figure 2.



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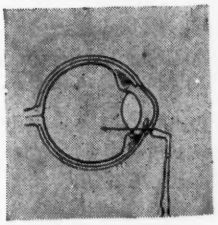

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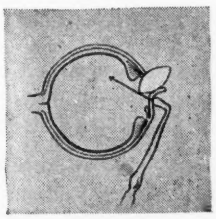

Figure 5.

Figure 6.

Figure 7.

Figure 8.

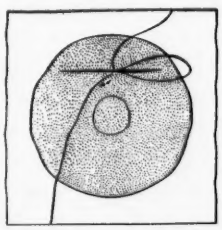

Figure 9.

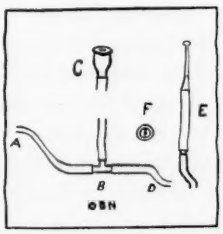

Figure 10.

is finished by the Smith method as a tumbler (Fig. 6, 7, 8).

When one becomes proficient or is ambidex-

trous enough to hold the erisfaco in one hand and use pressure with the other he can remove the lens with the sucker in one hand combined with constant pressure with the other, either in the upright position or as a tumbler, without removing the sucker from the lens. This technic is quite the same as advocated by Professors Barraquer and Elschnig, Drs. Vila Cora Nugent, Wolfe, Green and others, and is considered by many as being the last word in technical skill when using that method. It naturally requires much practice and a certain amount of ambidexterity which can be gained by practice as illustrated in the pictures.

The operation recommended by those who are not ambidextrous would, naturally, be the Smith method with pressure, or dislocating the lens below with the suction (Figs. 11-12) or with capsule forceps as recommended by Knapp or as in the Smith method, 6, 7, 8.

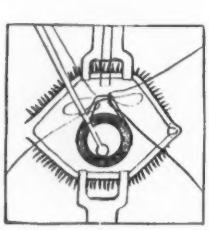

Figure 11.

Figure 12.

The greater part of Fisher's new suction method can be done with one's most facile hand, eliminating ambidexterity and also excessive pressure upon the vitreous, as in the Smith operation, and reducing the number of ruptured capsules as in the Barraquer or Elschnig method on account of non-ambidexterity. The operation is then finished by the Smith method as a tumbler (Figs. 6-7-8). This does not apply to Professor Barraquer or others who are ambidextrous.

Ruptured capsules, vitreous loss, iris prolapse and postoperative inflammation will be reduced to a minimum and a needling or second operation, which is not without danger, will be eliminated except when a capsule is occasionally ruptured. The average time in the hospital will be lessened, the vision better and the operation can be done successfully before the patient is blind. The pictures are self-explanatory.

THE ELSCHNIG TECHNIC FOR LENS EXTRACTION

HARRY GRADLE, M. D.
CHICAGO

The name Elschnig has been applied to the type of intracapsular extraction that really is a combination of various technics originated by this, that, and the other man; I think there would be about six different names. Elschnig combined them all into the operation known by his name. In the intracapsular operation in which forceps are used, they may be applied either at the upper margin of the lens, with consequent dislocation of the lens and removal by pressure and traction, or at the lower part of the lens with dislocation and partial traction and pressure. The Elschnig technic uses the lower pole for very definite reasons.

The preparation is much as Dr. Stevenson has outlined. The incision should be large, about two-fifths of the cornea, and should lie in the vascular portion of the limbus, and there should always be a conjunctive flap. Von Graefe said that no incision into the eye should be made except under the conjunctiva, and I am sure that holds true. The incision must cover two-fifths of the periphery of the cornea. Then conjunctival sutures are placed—one, two or three—through the conjunctival flap and the upper portion of the conjunctiva, tied loosely and laid aside. The ideal operation is with the round pupil, but that is not always possible for the pupil may not be dilated sufficiently to permit passage of the large nucleus. In many instances it is unduly difficult to grasp the capsule with the iris in position, and then an iridectomy must be performed. The question arises whether this should be completed before the extraction of the lens or subsequently. If it is to be complete, it is necessary to do it before the lens is extracted; but if a peripheral iridectomy or iridotomy, it may be done at the conclusion of the extraction. True, it is somewhat more difficult after the lens is out, and the danger of injury to the vitreous is somewhat greater. On the other hand, the end results are about the same. The peripheral iridectomy or iridotomy can be employed only if the pupil dilates sufficiently to permit passage

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of the intact lens. In that case the capsule forceps of the type devised by Elschnig are introduced by a side motion past the equator of the lens and at the inferior pole. Pressure is made backward with the tip of the forceps tending to push the lens backward and the capsule is grasped. Of course it is not possible to do so in large swolllen lens, because the forceps will glide off. But when it is grasped lateral rocking motions are used for about twelve seconds in order to break the lower zonular fibers. During this time no pressure is exerted by the hook on the outside of the eye, but as soon as the lower half of the lens is free, pressure should be started below the limbus. The purpose is to force the lower portion of the lens upward and forward.

The ideal operation is tumbling of the lens, and this introduces safety into this form of extraction. The capsule forceps are held in situ but instead of pull, the larger force is push—80% push and 20% pull. If you are not sure the lens dislocation is complete the rocking motion is continued. The lens should tumble with the lower pole presenting first in the wound. As the lower pole comes up the upper pole holds back the vitreous protecting against a prolapse mechanically. If we are dealing with an extremely fluid vitreous, and if vitreous prolapse occurs during operation, it occurs just above the equator. The push is then continued and the more the lens approaches delivery, the more push, the less pull, until at the point of delivery the forceps are doing nothing but holding the lens in position with no traction. This is practically all carried on throughout with the hook outside the eye.

At this point, if you have not performed the peripheral iridectomy or iridotomy the iris may be pushed back into place. It may be done afterward, though I think it is a little more safe to do it before. As soon as the lens is delivered and the iris incised, the stitches are tied and then a spatula is inserted to smooth the pupil. Eserin is instilled, one drop 0.5% at the time the stitches are tied, when the iris is smoothed, and finally when the lid is closed. The iris should be smoothed with the flat of the spatula, not the point. It is much easier to get the iris in position after peripheral iridectomy than complete. The end results are better from the standpoint of appearance, and lack of circles of diffusion upon the retina. Approximately 50 to 60% can be performed through a round pupil. In the remainder, I have found it necessary to do a complete iridectomy.

What percentage of cataracts can be removed intracapsular? We use Elschnig's classification —plus, a lens removed completely within the capsule; plus-minus, where the capsule breaks at the point of delivery so that practically all is removed; and minus, when it is impossible to remove the lens in capsule. In my own cases I find 60%+, 20%±, and 20%—.

I think this type of delivery is the safest intra-capsular operation that there is. But how does it compare with extra-capsular operation as regards safety? In my own rather limited cases, I found the loss of vitreous slightly greater in the extra-capsular operation. Possibly this was because we selected our intra-capsular cases a little more carefully than the extra-capsular. I also found there was a slightly greater tendency toward prolapse of the iris in the intra-capsular than the extra-capsular. Of course, after intra-capsular, needling is eliminated, whereas with the extra-capsular needling has to be performed in many cases. In other words, the intra-capsular eliminates the necessity of the second operation. As regards the end results of vision, it is practically the same. As regards final astigmatism, practically the same—the average astigmatism after intra-capsular is 2.2 diopters, after extra-capsular 2.21. The stay in the hospital after operation is markedly less after intra-capsular. There is a more rapid healing, less subsequent irritation. The final results have always seemed exactly the same. Occasionally detachment of the retina occurs after any cataract operation; it seems to occur as frequently after either.

So taking it by and large, the intra-capsular offers a few advantages definitely over the extra-capsular. However, it is more difficult to perform, but for a person who operates regularly that small difference in difficulty plays no great role. The patient gains definitely by a shorter

stay in the hospital, by less irritation of the eye, and by elimination of the second operation, the necessity for which is present in a fairly large percentage of cases of extra-capsular operation.

EXTRACAPSULAR EXTRACTION OF LENS

HARRY WOODRUFF, M. D.

JOLIET, ILLINOIS

I thank the two previous speakers for leaving such a fine opening for the discussion of the extracapsular operation. It is not necessary to go into the description of the operation, of course—the preparation, the question of whether iridectomy or iridotomy should be done, the sutures, etc., apply just the same in both. It seems to me that the advocates of the intracapsular operation, while they tell us that the operation is adapted especially to immature cataracts in people beyond the age of 55 or 60, do not always follow their own advice. Of course in an audience of this kind there are probably many eye doctors who are doing only a few cataract operations. They cannot expect to follow a complicated technic or to change their technic frequently, because they have not the material upon which to work and have not the advantages of large clinics. They have to use their best judgment. Nicholas Senn once said that the best surgeons were those who use the best judgment. We might have great technical skill and yet not always use good judgment.

It seems to me that the question has been pretty well determined so far as intracapsular and extracapsular operations are concerned, and I would say something like this. If you have a patient beyond the age of 55 or 60 with an immature cataract you have an ideal case for some form of intracapsular operation. You have conditions in which the capsule is less apt to rupture and the suspensory ligament is most apt to give way. On the other hand, in a patient of that age, with a mature lens it is unnecessary. You can remove a piece of the anterior capsule by forceps, or if the lens dislocates, it can be removed in capsule. Or you can use a cystitome, preferably making a peripheral opening so as to avoid the bands of capsule which are difficult to needle. So we are now able to take care of a mature or immature cataract in people beyond 60. If it is an immature lens in a patient under 55, you have a more difficult problem because you have a patient who is too young for an intracapsular operation, and if the condition has reached the point where the patient's vision is so poor that he is disabled from performing his business affairs, you must operate on an immature cataract which must be by the capsulotomy method to be consistent, or wait for it to ripen. You rarely hear of ripening cataracts now. You hear of the Homer Smith method of needling. One of the objections to other forms of ripening is that they only ripen the outer layers of the cortex. I think probably the preferable way of handling these patients under 55 is by the capsulotomy method with some form of anterior chamber irrigation after the suture has been put in place. The risk is so much less of viterous prolapse if the suture is tide, than if you attempt irrigation without tying the suture.

I believe we have really arrived now at a pretty clear understanding of when to perform an extracapsular and when to perform an intracapsular operation—if we will only be consistent. There is absolutely no complication whatsoever except the complication of the capsule in performing the operation at any age, because you can completely remove the cortex and have only the capsule to deal with, which really is not a formidable affair. You have needling to consider, and I think the percentages given are questionable unless you do some form of needling at the time you do the extracapsular operation, which is not at all difficult or dangerous.

I would like to call attention to a suture which I think is quite an ingenious affair. It has the advantage that you can tie the suture with eyelids closed. You know that if you have prolapse of vitreous you are not anxious to keep that eye open—you wish to close it tightly and with this suture, suggested by Berens of New York, this is possible.

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THE PREVENTION OF COMPLICATIONS IN THE CATARACT OPERATION

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CHICAGO

There is only time to speak of the most important complications of the cataract operation. It is by their prevention, however, that our operative results will stand or fall and no detail which will prevent any one of them in one out of a hundred cases is too minute to be worthy of our serious consideration.

The once-dreaded complication of purulent infection is now so rare that many ophthalmologists have never seen a case. It seems likely, however, that many cases of so-called postoperative iridocyclitis, which all of us have seen, are really due to organisms introduced into the wound at the time of operation. All we can do to prevent both types of infection is to preserve the most careful asepsis during the operation, to postpone operation until the conjunctival sac is clean, and to insure closure of the wound so that infection may not occur in the first few days after operation. Aside from meticulous technique in the preparation of instruments, we must carefully avoid touching the skin or lash-border with the point of any instrument which enters the eye, a detail by no means always observed. We may also refrain from touching the entering tips of our instruments with our own fingers, the sterility of which, unless we use gloves, can never be guaranteed. Instruments should be dry, so that no fluid runs from the handles into the eye. Irrigation of the anterior chamber, if performed, should include only the operative field and not the skin.

Preliminary cultures of the conjunctival sac are of value only if very carefully conducted. It is usually sufficient if blepharitis and chronic conjunctivitis are first controlled, and if every case is given a mild antiseptic to instill several times a day for a week before operation. Infected lacrymal sacs must, of course, be removed or destroyed some weeks before operation and it should be a routine to investigate the lacrymal passages in every case. If these precautions are observed, frank infections will be exceedingly rare and iridocyclitis will be reduced to a minimum. Those cases due to retained lens material will be discussed by Dr. Cushman.

Expulsive hemorrhage is a complication fortunately rare, but one justly dreaded, since it means loss of the eye. In many clinics such as that of Elschnig at Prague, it is the custom to withdraw 300 to 500 cc. of blood from every case with high blood pressure to prevent this complication. From what I can learn, however, this procedure can seldom be of real value, since it is followed by a vasomotor reaction which sends more blood to the peripheral circulation at once. We can often reduce blood pressure, however, by preliminary medical care and a few days of bed rest before operation. The hemorrhages which follow immediately upon expression of the lens are exceedingly rare. If one has taken the ocular tension and knows that it is not elevated, all that can be done to prevent these is to eliminate all unnecessary pressure and traumatism and to finish the incision and express the lens slowly, so that the tension may not be too suddenly reduced. Usually, however, the hemorrhage occurs some hours after the operation. What has happened is that the anterior chamber has been reformed and due to a slight movement of the patient or merely to the pressure of the aqueous itself, the wound is reopened. The sudden reduction of tension places a strain on vessels previously traumatized by the operation and the hemorrhage occurs. Here there is a preventive measure which is of the greatest importance. This is a good conjunctival flap, held by carefully placed stitches, which will keep the wound from re-opening. The form of flap which I regard as safest will be described later, but there are several forms almost equally useful for this purpose.

I regard another measure, usually not considered, as also of great importance. This is the elevation of the patient's head for the first few days after operation. Whether one operates in bed, as I prefer, or has the patient transferred to bed on a stretcher previously placed under him, it is always feasible to elevate the upper part of the bed to an angle of 15 or 20 degrees immediately after operation, and to leave it so for the first few days. This certainly tends to lesson congestion of the head and even the smaller late hemorrhages into the anterior cham-

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ber, which usually occur during sleep, are, I believe, much less frequent when the patient is thus elevated.

A more common complication than those previously described is prolapse of the iris. Here one's whole method of operating comes into question and the principles of iridectomy or simple extraction will enlist adherents on both sides. The position of one who is discussing the prevention of complications is, however, a simple one. By operating for senile cataract without any iridectomy we are simply courting iris prolapse. Even if it occurs but once in a hundred cases, this is too often, if it can be prevented. One's only conclusion must be that if he wishes to prevent it, he will perform either complete or peripheral iridectomy. The latter will be preferred in younger persons with pupils which dilate fully and where the iris is easily replaced after the lens is removed. It may be said that a small peripheral iridectomy offers practically the same insurance against iris prolapse as a complete one and that it is not necessary to instill eserine to prevent prolapse when peripheral iridectomy is employed. In performing it, I prefer a sharp iris hook with which a few fibres at the iris root are pulled out and cut off very close to the hook, the method of Kalt. It is performed after expression of the lens, as when performed before, the lens tends to be forced into the new opening rather than through the pupil. Even after iridectomy, however, either peripheral or complete, prolapses do occur. They occur, as hemorrhages occur, when the chamber is refilling and suddenly re-opens. Here again, a well sutured conjunctival flap is our best preventive measure. I do not regard the bridge flap as offering proper insurance in this respect, unless sutures are placed in it fairly near the limbus. Without these, the wound is held only by the tension of a long flap of conjunctiva which is slight.

A very safe form of flap is the one described by Kuhnt for covering penetrating wounds and first used for the cataract operation by Van Lint. With very sharp scissors, the conjunctiva is undermined at the limbus well back to the upper fold. The denser band at the limbus must be included, and the flap must be so loose as to slip down over half the cornea without the slightest tension. It circumscribes the upper half of the limbus. Two stitches are placed through the flap and through the bulbar conjunctiva below and one turn of a surgeon's knot is placed in each. The loops are drawn back so that plenty of room is left for the incision. One is now free to devote his whole attention to the incision which is easily visible, and may be placed very exactly at the limbus. There is no danger of making it too deep, as when one is trying to make a flap with the knife. At the close of the operation the sutures are tightened till the flap covers the upper third of the cornea, and the knots are completed. The wound is now really closed, and if the patient vomits, coughs or even gets out of bed, it remains closed. The stitches are left in for 5 to 7 days, and after their removal the flap slowly retracts to its original location at the limbus.

Undoubtedly the most important complication of the cataract operation is loss of vitreous. I was brought up to regard the loss of even what is politely known as a bead of vitreous (the beads of some operators being more like marbles) with holy horror and have never gotten over the sinking sensation in all the viscera which attends it when it does occur. In certain cases with fluid vitreous and hypermature cataract with a defective zonula it is unavoidable.

The prevention of vitreous loss is nearly always possible in normal cataract cases and depends upon a number of essential precautions. Most important of these are perfect anesthesia and akinesia, so that squeezing on the part of the patient is absolutely eliminated. Retrobulbar injections offer perfect anesthesia, but are attended with such marked hypotony that it is sometimes difficult to express the lens if one waits too long. In the intracapsular operation, however, it seems advisable and this hypotony I have always felt was one reason why Elschnig so seldom lost vitreous. In most cases subconjunctival injection of two drops of 4% cocaine at the sites of fixation and incision followed by a wait of 4 minutes will give perfect anesthesia. Akinesia may in many cases be unnecessary but it can never be foretold which patient will squeeze, and there is no valid reason for not employing it in every case.

To avoid undue pressure in removing the lens by any method the incision must be large enough, at least ⅔ of the corneal circumference.

If not large enough it must be enlarged by one snip of sharp scissors at either angle of the wound. For the intracapsular extraction it must include almost half the cornea. In the extracapsular method it is almost equally important to have a large enough capsulotomy. If the lens does not present at once on pressure with the hook, either the corneal incision or the capsulotomy wound, or both must be enlarged before the expression is completed. The lens must slip out easily or vitreous is almost sure to follow it. The expression must be steady and slow enough so that the lens does not come out with a rush. The same is true of the incision, which after rapid puncture and counterpuncture, may be finished more slowly and with almost no pressure by the fixation forceps. It is better to leave a few flakes of cortex than to make pressure after the lens is expressed or to go in for them with a spoon. Irrigation is safer than this, but the stream must be directed away from the vitreous, as I have seen vitreous lost during irrigation.

In the hands of the best operators, vitreous loss by the intracapsular method is reduced to a very low percentage, as low as that of other operators by the extracapsular method. But there can be no doubt that it is more frequent by the intracapsular method as employed by the occasional operator or the one who is learning the method. And one must weigh this disadvantage with its undoubted advantages before employing it in a particular case. Certainly most of us will agree that the intracapsular method is especially dangerous in certain types of case. Persons past the age of 70 are very apt to have partially fluid vitreous and hence it is especially dangerous here. In high myopia the same contraindication exists. Below the age of 55 it is often impossible as the zonula is too tough, and the pressure required to break it entails a definite danger of vitreous loss. Its special indication is in persons between the ages of 55 and 70 with immature cataract.

With either method, a speculum which exerts no pressure on the globe is necessary. One should try the speculum and if raising it allows the eye to sink backwards, it is too large and must be held up by an assistant during and after the expression of the lens. Canthotomy is always useful in reducing tension of the lids when the palpebral fissure is short and has been employed by some operators such as Axenfeld in every case. A good speculum should exert no pressure but many operators prefer to have the lids held open by hooks or sutures through the lids to avoid any chance of pressure.

Vitreous is occasionally lost at the first dressing, but this can always be prevented. If this dressing is postponed for 4 days till the wound is healed it will almost never occur. Lest it should, however, one should very carefully instill one or two drops of cocaine in the lower cul-de-sac before opening the eye, so that squeezing will not occur. No pressure should be used, of course, on the upper lid.

A rigid shield should be part of every cataract dressing and it is surprising to find this simple precaution neglected by some operators. This shield of my father's may be made to fit anyone and a hole may be cut for the other eye without destroying its architecture. It is worn for 2 or 3 weeks after operation, the inside dressing being dispensed with after the first week.

SUMMARY

1. A well sutured conjunctival flap will often prevent hemorrhage, prolapse of iris and late loss of vitreous.
2. Some form of iridectomy is usually essential in preventing complications, except in soft cataract of children or traumatic cataract below the age of 40.
3. Pressure should be minimized, especially by ample corneal incision and capsulotomy.
4. Cases should be carefully selected for the intracapsular operation.

ENDOPHTHALMITIS PHACOGENETICA

BEULAH CUSHMAN, B. S., M. D.

CHICAGO

The term endophthalmitis phacogenetica was first used by Straub in 1919, to describe those inflammatory reactions following cataract operations, in which there were some lens remnants and no other cause could be determined.

In 1922 Verhoeff and Lemoine read a paper before the International Congress of Ophthalmology which met in Washington, and called the

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inflammation which developed after the retention of lens remnants, phaco-anaphylactic endolphthalmitis.

They reported it as a specific clinical entity with a histopathological picture as due to hypersensitivity to lens protein, which might be congenital or acquired.

Several German ophthalmologists sharply disagreed with Verhoeff and Lemoine. And Gifford in this country, after experimental and clinical studies which were reported in 1925, concluded "that at best in most cases the split products resulting from the autolysis of the lens remnants were responsible. That the postoperative inflammation was due to inherent toxicity of the lens material itself rather than to allergy." This would explain the clinical observation that material from hypermature cataracts causes much greater reactions than from immature ones, that the second discission on juvenile cataracts frequently cause reactions and also explain the inflammation which develops following dislocation of the lens. The inflammations which frequently develop in phthisical or atrophic bulbs could also be explained by a slight injury which might cause the rupture of the lens capsule, subsequent to the pulling of the intraocular adhesions and the liberation of the cortical material.

The clinical picture as described by Verhoeff and Lemoine was that following liberation of the lens material into the eye and a definite inflammatory reaction occurred. If the lens material were in the anterior chamber only, there occurred marked conjunctival edema, vascularization of the cornea, hypopyon depending on the severity of the reaction, and the formation of a dense pupillary membrane.

If the lens was extruded into the vitreous an involvement of the ciliary body was marked with all the symptoms of a severe cyclitis.

The histo-pathological picture was a vascularization of the cornea, formation of dense fibrous pupillary membranes, when the lens substance was in contact with the iris, and the marked invasion of the lens fibres by pus cells. If the lens remnants were in the vitreous, a marked invasion of the ciliary body was present and polynuclear infiltration of the lens.

Professor Lindner in his course of lectures before the Chicago group this spring stated that he believed the cause of inflammation of the eyes with lens remnants was due to infection. He said that parasites grow best on dead epithelial cells, and as the nucleus and most of the cortex of the lens is made up of dead epithelial cells, any lens remnants became excellent culture media and that the inflammation was of bacterial origin. This theory of Professor Lindner's does not explain the clinical picture found in the eyes in which the bulb has not been opened, as in dislocation of the lens.

With these varied opinions the question of this type of endophthalmitis developing after cataract operations remains unsettled, but I want to report briefly two cases following cataract extraction which may be classed as phacogenetic endophthalmitis. If the lens remnants had been treated in the first as in the second case reported, the inflammation would no doubt have been much less severe.

Case 1. Mr. W. W. H., lawyer, age 66 years, came in December 1, 1933, with history of gradual loss of vision the past year, and for five months previously had been unable to do any near work. General health always good, and recent complete general examination negative, some dead teeth were negative to roentgenograms.

Examination: R. V. 0.6—2; L. V. 0.6+2. No Jaeger with either eye, and no improvement for distance with glasses, but Jaeger 2.50 in each eye with +3.50 lens. Pupils were equal, reacted to light and convergence. Anterior chambers were deep and the tension with Schiotz tonometer was 22.0 in each eye.

There were bilateral posterior saucer-shaped lens opacities in each eye and extension forward involving the anterior cortical fibres in the right eye. The vitreous was not visible. Few peripheral fundus vessels were normal in appearance. The peripheral and central fields were normal and color perception good.

The right conjunctival cultures were positive and remained so after treatment, so that the sac was removed on December 8. The conjunctival cultures were negative December 17 and 19.

December 21, 1933, right cataract extraction was done, with a conjunctival bridge, and opening of lens capsule with the corneal section. A peripheral iridectomy was made and the lens nucleus and cortex were flushed out with sterile normal salt solution. Atropine was instilled and both eyes bandaged.

The following day he complained of being uncomfortable, and the dressing was changed. The anterior

chamber was reformed and small amount of cortex was present in the 4.5 mm. pupillary area.

12-25-33. Eye in good condition.

12-28-33—or seven days later. Suddenly an intense ciliary injection and conjunctival edema developed. The cortical remnants were the same size, but less flocculent in appearance. Injection of 8 cc. milk was given, and scopolamine ¼% ordered every three hours, as conjunctival reaction was thought to be due to an atropine reaction.

12-29-33. Condition greatly improved.

12-30-33. Scopolamine psychosis. Eye in good condition.

12-31-33. Nausea and vomiting.

1-1-34. After consultation it was agreed to try to increase the dilatation of the 4.0 mm. pupil and desensitize with less antigen.

0.5 cc. lens antigen, as prepared by Dr. Elias Selinger at Rush Medical College, was given intradermally. Only a slight local positive reaction was noted two hours later, which remained for an hour. The following day the irritation of the eye seemed less. January 6 there was no pain in the eye, but the cortex had the same leathery appearance, with linear hemorrhagic infiltration into the lens cortex from the iris at 10 o'clock. On this day 1.5 cc. of lens antigen was given intradermally, and there was a severe local and focal reaction. The local reaction (5×4.5 cm.) with intense edema, appeared within 45 minutes, and pain began in the eye 12 hours later, and in 24 hours there was a marked hemorrhagic infiltration into the cortical remnant but no hyphemia was present.

The following 48 hours the pain rapidly lessened and a thick pupillary membrane was beginning to form by flattening of lens remnant and infiltration.

1-10-34. Desensitization doses of lens antigen was begun, and no local reaction occurred, but there was an increased hemorrhagic infiltration of the mass after the first dose.

1-12-34. Slit lamp examination. There were no posterior precipitates, no ciliary tenderness or injection, the inferior portion of anterior chamber was flat, and upper portion deep.

1-15-34. Homatropine instilled and intense burning developed, and three hours later the anterior chamber was filled with blood.

1-18-34. Milk injections started and blood gradually absorbed.

1-31-34. Vascularization of the limbal area of the cornea was first noted.

Diluted lens antigen continued in desensitizing doses.

2-5-34. Dr. Sanford Gifford was seen in consultation, and a poor prognosis was given, with danger of sympathetic ophthalmia.

Auto blood injections and lens antigen were given regularly and the inflammation gradually cleared up, so that a right iridotomy was attempted March 14, 1934, but the eye became too soft after a retrobulbar injection, and the anterior chamber filled with blood.

Typhoid injections were given following this, and the eye quieted down rapidly, and on April 7 the cornea was slightly flattened, and blood stained. There was corneal vascularization, except the central area (4×5.0 mm.), which was free. There was no flattening of the equator and no ciliary injection. There was temporal light projection and perception.

The left eye always remained free from any irritation or injection.

November 21, 1934, report by letter was that the right vision, with temporal light projection, remained the same, and the eye white, with a dense pupillary membrane.

The posterior subcapsular opacity had not increased in the left eye and vision remained the same for distance and had improved to Jaeger 1.00 at 22 cm.

Case 2. Mrs. M. P., age 55, came for examination December 4, 1934, with history of gradual failure of left vision the past five years, which began following removal of her teeth, and since July, 1934, light perception had only been present. Mother, sister and one uncle had had cataracts.

Findings: R. V. 0.8—3; L. V. good light perception and projection. No Jaeger either eye.

With glasses: R. V. 0.8+3 and Jaeger 1.00 at 24 cm. L. V. Good light perception and projection, and color perception normal. No Jaeger.

There was a left divergence of 20° (perimeter), movements of each eye normal in all directions. Pupils unequal, left larger than right, both reacted promptly to light and convergence, and the consensual reaction was normal. Anterior chambers were of moderate depth, and the tension with Schiotz tonometer was 22 in right and 18 in left eye. The right fundus was normal.

Right lens: Posterior subcapsular saucer-shaped changes with granules and crystal reflections, which extended forward, involving the anterior cortical layers. The nucleus was clear.

Left lens: All layers involved in a dense milky white homogenous opacity. No capsular exfoliation.

Diagnosis: Right incipient complicated cataract. Left mature complicated cataract.

Conjunctival culture was taken, and 1 cc. lens antigen given intradermally, both of which were negative after 24 hours. Blood sugar was 146 mg. per 100 cc. of blood. She was put on a diabetic diet by her general physician, and on January 30, 1935, the blood sugar was 78 mg.

2-4-35. Left cataract extraction. A conjunctival bridge, opening of lens capsule with corneal section, and peripheral iridotomy was made, and the nucleus and lens cortex removed by irrigation with normal saline. Pilocarpine 2% instilled.

Four days later, at first dressing, left vision, fingers 2 ft. easily. Slight swelling right upper lid and conjunctival edema. Cornea clear. Anterior chamber deep, pupil round, 5 mm. No cortex apparent. There was a small amount of fresh blood over the pupillary area. Atropine 2% instilled.

The following day patient stated there was slight

pain for a short time during the night. At this time a small amount of cortex was visible over temporal margin of pupil.

2-11-35. Conjunctiva more edematous, cornea clear, pupil 4.0 mm. There was a round faint yellowish leathery-like mass of cortex 2x3 mm. lying temporarily in the pupillary area. Iridotomy wound in good position.

2-12-35. The leathery mass appeared to be infiltrated with blood and apparently becoming vascularized from 2 o'clock; pupil 5.0 mm. Tactile tension good.

2-13-35. Conjunctival edema same. Posterior to pupil there was a thin membrane on which the solid looking yellowish round mass of cortex remained.

The same afternoon the anterior chamber was opened through the first incision 9:30 to 11, and the mass aspirated and irrigation of the anterior chamber with sterile normal saline.

2-14-35. Anterior chamber was reformed. There was no conjunctival edema and the pupil was 4.5 mm.

2-15-35. No conjunctival edema and ciliary injection markedly lessened.

2-16-35. 0.5 cc. lens antigen was given intradermally, and 5x7 mm. edematous area developed in three hours, and remained about three hours. There was no change in condition of the eye.

3-18-35. Needling of the thin membrane was done, and

3-27-35. Manifest: L. E. +9.00 w +2.00 ax 45 = 0.8 +4.50 added. J. 0.62 at 25 cm.

Fundus normal.

SUMMARY

In summing up the results in these two cases, and comparing the findings with the clinical and laboratory reports of other workers, I feel that it was probably the cortical remnants which acted as a toxic factor. In these two cases the remaining cortex lost its flocculent appearance within the first four or five days and became a rather dense yellow mass, which was infiltrated with blood. The prompt and rapid improvement after the removal of the lens substance by aspiration and irrigation in the second case, makes this method seem to be the logical procedures in the condition known as phacogenetic endopthalmitis.

To determine an allergic reaction certain factors must present themselves. There must be a possibility for sensitization previously, as by ingestion of lens material, an intradermal test with the injection of lens substance, or freeing of lens substance in the eye, with subsequent encapsulation of the remnants. Then with an operative procedure or in any other way in which the lens remnants would be freed, sudden conjunctival edema and other symptoms of anaphylactic irritation would appear.

In the first case in which there had been no previous opportunity for sensitization as far as could be determined, the symptoms appeared on the 7th day, and the first intradermal test with 0.5 cc. lens antigen made on the 11th day was negative. But the second intradermal test with 1.5 cc. of lens antigen made 6 days later, or 13 days after operation, was markedly positive focally and locally.

The second case had had the test for lens sensitivity about two months previous to the operation, and the irritation due to lens remnants should have appeared within twenty-four hours after the liberation of the lens material, but the symptoms of irritation did not appear until the seventh day.

As these two cases do not fit into the requirements for an allergic reaction, they should then be classified as due to the toxicity of the lens remnants themselves, and these two cases be called phacogenetic endophthalmitis.

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DISCUSSION OF SYMPOSIUM ON SENILE CATARACT

Dr. W. A. Fisher, Chicago: It is a pleasure for me to open this discussion because I, too, have had the pleasure of listening to Professor Lindner of Vienna in his course given in Chicago, and many of you have had the same pleasure.

Professor Lindner states that he now has laboratory proof that postoperative inflammation is toxic and due to retained lens matter and that the bacteria (saprophytes) causing this toxic inflammation could not exist without lens matter to live upon and would naturally either not appear or die before postoperative inflammation could occur. If this be true, postoperative inflammation could not follow if the lens was removed within its capsule without complications.

Lindner states that since his discovery the intracapsular operation has become popular in Vienna and he believes his discovery will remove the last objection to

the intracapsular operation from operators who have been doing the capsulotomy operation and recommending it.

Dr. Louis Bothman, Chicago: I would like to call attention to a statement which Professor Lindner made while in Chicago. In a conversation with him I asked what form of akinesia was used in his clinic, and he said they were not using the method of Wright and O'Brien, but had gone back to the Van Lint, because they had seen several cases of facial paralysis develop after the O'Brien akinesia. I have used it a great many times myself, and have never seen that complication. Lately I have been using the Van Lint entirely. Col. Wright, who first introduced the so-called O'Brien akinesia, reported facial palsy by this method (Arch. Oph. **52**:166, also **55**:555).

I cannot agree with Dr. Woodruff that in capsulotomy operations almost 100% require needling; I should say that it would be more nearly 20%. One other point, about irrigation used in the capsulotomy operation. Most of us are using a thin tip which is introduced into the anterior chamber following the lens extraction. Dr. Wiener of St. Louis irrigates using an ordinary glass cylinder to which is attached a rubber tube and the tip of an ordinary medicine dropper, flattened to permit a small stream. He directs the stream onto the corneoscleral junction of the wound. He does not hold the tip nearer than 1½ inches from the incision. He uses no conjunctival flap and succeeds in clearing the anterior chamber almost as well as we do by other methods when we sometimes introduce the tip into the anterior chamber.

Dr. Sanford Gifford, Chicago: I intended to mention that one of the chief advantages of the flap is that you can see the incision as you make it; it is not in your way. It is shaved off the limbus and retracted away from the limbus entirely. There is never the tendency to make it too deep, as when you are making it with a knife. Then it is not in your way and you can see through the cornea and there is no interference with vision in grasping the capsule or in doing anything else.

Dr. M. L. Folk, Chicago: I am surprised to learn that Dr. Nugent puts in eight or nine sutures. He used to use only two or three. I should say it would be too dangerous in the average case to fool around with nine sutures, as one could easily lose vitreous while putting in the sutures. In regards to iridotomy, it seems to me that it is not going to prevent prolapse of the iris. I asked Professor Lindner about this and he said an iridotomy does not prevent prolapse. He believes in either complete or peripheral iridectomy.

Dr. Harry Woodruff, Joliet: I am inclined to the opinion that a needling is necessary or at least advisable in any capsulotomy operation. There is always the posterior capsule which will later wrinkle and become more or less opaque. Naturally one is influenced by the visual acuity. If vision is 20/20 even with the intact posterior capsule conservatism would incline one to postpone the needling.

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SCARLET FEVER

(Susceptibility and Active Immunization)

SILBER CHARLES PEACOCK, M. D.

CHICAGO

Susceptibility. Over 75 per cent. of the cases of scarlet fever occur during the first ten years of life. Less than one per cent. of those contracting the disease are found at or under the first year. This lessened disposition to contract the disease during the first twelve months is most pronounced in nurslings under 6 months. Scarlet fever is indeed quite rare under 3 months of age.

During the past 16 months, 3,029 children[1] which were practically all of the charity patients admitted to the Children's Memorial Hospital were Dick-tested as a rule within the first 24 hours of hospitalization. They ranged in age from new borns to 13 years. It was possible to analyze the susceptibility of these children according to age levels. Under 3 months to 6 months susceptibility to the disease was decidedly low, 1 out of 11; and from 6 to 12 months it was sharply elevated to 1 out of 2. At 1 to 2 years, about 4 out of 5 were susceptible; at 2, 3 and 4 years, 3 out of 4; at 5 to 8 years, 1 out of 2; at 9 to 11 years, about 1 out of 3, and from 11 to 13 years approximately 1 out of 4. Therefore, it would seem from the results of these skin tests that the most susceptible period for contracting scarlet fever is from the 1st to the 8th year of life. (See graph.)

Considerable natural immunity[2] to scarlet fever is attributed to the American Indians, Eskimos, Negroes, East Indians and South Africans.

Rural adults having histories negative for the disease are commonly susceptible to scarlet fever. On the other hand, adults that have sojourned most of their life in the average large cities with histories negative for scarlet fever do not as a rule develop the disease on definite exposure. Probably many of these have been immunized previously from insignificant infections through harboring scarlet fever streptococci. In this connection, it is not uncommon to observe Dick negative adults who have had recent contact with

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Read before Section on Pediatrics, Eighty-fifth Annual Meeting, Rockford, May 21, 1935.

cases of scarlet fever experiencing no rash but definite attacks of sore throat or tonsillitis accompanied perhaps with fever or malaise. Such observations produce a squeamish attitude on the part of the clinician in accepting wholeheartedly the idea that persons reacting negatively to the Dick test are assured complete protection against the invasion of scarlet fever organisms.

Notwithstanding this controversial situation a universal trial of the Dick test over a decade a fair index of the degree of susceptibility. The erythema is not indurated and practically disappears on making the skin taut. If the area is indurated and a nodule, perhaps from trauma, is present, the test should be repeated if there is a question as to the interpretation of the reaction. No reaction at the site of injection as a rule indicates immunity. Less errors are made in interpreting the reaction to the Dick test when it is performed in duplicate. It should be the

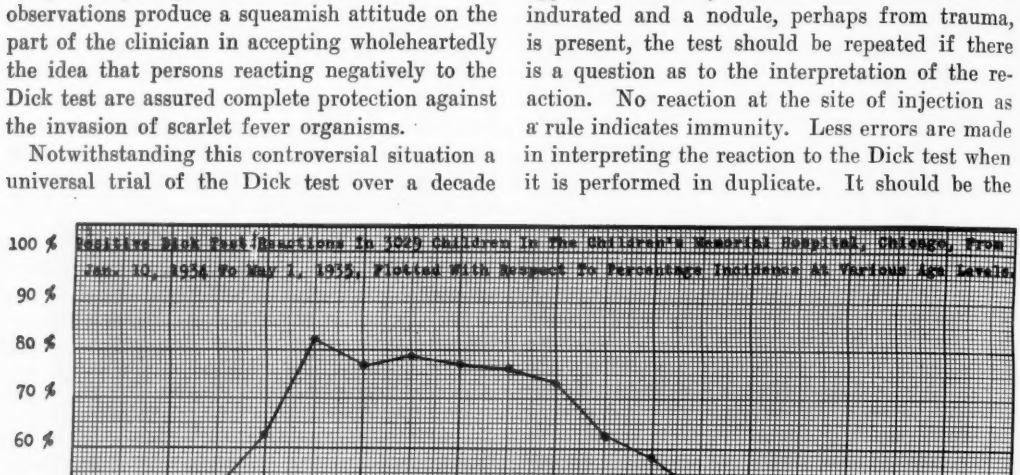

Fig. 1. Percentage incidence in age groups of positive Dick test reactors in 3,029 children.

has shown that at least 90% of the time the test is a good measure of the susceptibility to scarlet fever. The test consists of the intracutaneous injection of 0.1 cc. of toxin obtained from at least two or more strains of hemolytic streptococci isolated from proved cases of scarlet fever. The middle part of the flexor surface of the forearm is the best site for performing the test. The skin should be cleansed with ether or 95% alcohol and allowed to dry before making the injection. Weaker alcoholic solutions do not evaporate promptly from the skin surface and may render the toxin inert through precipitation.

The test should be read within 22 to 24 hours and preferably in the daylight. Occasionally artificial light is a handicap in discerning faintly positive reactions. An erythema of about or more than 1 cm. in diameter indicates susceptibility. The size and intensity of the reaction is habit to make the test in duplicate. Occasionally some cases of scarlet fever found occurring in persons having had negative reactions to the Dick test were those in whom the reaction to the test was erroneously interpreted.

Some workers are of the opinion that a positive reaction to the Dick test is an allergic phenomenon and, therefore, toxin injections only immunize the person against the rash element of the disease. There are not a few exponents of this idea in the United States[3] and elsewhere.[4,5] However, the undisputed excellent long term results obtained through immunization by the 5 or more injections of the sterile commercial toxin in institutions and in private practice, renders that theoretical view untenable.

In the State of Illinois as a whole in 1929 to 1933 inclusive there were on an average over 16,000 cases of scarlet fever annually. There was an average of 1.9% deaths from the disease

per year. The average mortality per 100,000 population was 3.9. However, in 1934, there was an increase of 5,000 cases but the mortality rate remained the same. It may be argued on the basis of the mortality rate that there is not sufficient ground to warrant the use of active immunization. The prevention of disease should always be the goal in the practice of medicine.

Active Immunization Against the Disease. Five graduated injections of the sterile commercial toxin at about weekly intervals are sufficient to produce negative reactions to the Dick test in at least 90% of the susceptibles. It is advised that the Dick test should be repeated about two weeks after the fifth injection of the toxin. If a positive reaction is obtained, the fifth dose is to be repeated.

Reactions Following the Injection of the Toxin. The size and intensity of the person's local reaction to the Dick test is of some indication as to the frequency and the severity of systemic reactions which may follow the injections of the toxin. Some of these reactions measure as much as 3 to 5 cms. in diameter. The average reaction, however, is about 2 to 3 cms. in diameter. From 10 to 20% of those injected experience marked local or systemic reactions. The common systemic reactions are usually malaise, joint pains, nausea or vomiting and occasionally rashes, scarlatiniform or urticarial in character. Some may complain of abdominal pain which may or may not be associated with a few loose stools. These reactions are of no serious consequences. However, at least 75 to 80% of the persons receiving the toxin injections experience no systemic reactions.

Adults and older children are more likely to experience systemic reactions than are younger children. As a rule active immunization by the toxin injections is carried out with a negligible number of reactions in children around 2 to 6 years of age. Those age levels are the most desirable periods for the immunization.

If a severe reaction occurs it is sometimes advisable to mix adrenalin hydrochloride 1:1000 (m iii) with the toxin in the syringe just before the injection.

The practice of repeating the Dick test 2 to 3 weeks after giving the fifth dose of toxin should not be neglected. If at that time there is any question at all about the test being positive the fifth dose of toxin should be repeated. On an average about 5 to 7% require the fifth dose to be repeated.

Durability of Active Immunization from Toxin Injections. On the whole the durability of active immunization against scarlet fever from the toxin injections seems to have been very good, judging mostly from the results that have been obtained in this country and elsewhere, especially in institutions, in some city health departments and to a less extent in private practice.

Doctor J. N. Henry[5], Director of the Philadelphia Department of Health, informed me recently that they had used scarlet fever toxin for active immunization over a period of 10 years. Since 1932 he has employed it extensively in schools and homes. In his judgment he rates the toxin immunization for scarlet fever as on a plane equal to the procedures employed for immunization against diphtheria. He affirms that better than 90% immunity is found at the end of several years following Dick toxin immunization. He has tabulated the data in a paper which he will read before the next Pediatric Section of the American Medical Association at Atlantic City.

During the past 8 years, Doctor J. W. Armstrong[6] has used the toxin injections for immunization against scarlet fever at Berea College. During that period about 700 students have been immunized against scarlet fever. He informs me that none of those who received the toxin injections since 1929 have contracted the disease. He also believes that the 5 injections will immunize over 90% of the cases.

In their series of cases 70% of those immunized experienced no reaction beyond the local site of the injection. They have not had any complications following the toxin injections. This immunization programme at Berea College seems to have been a great success and the majority of the students volunteer for the immunization.

Doctor J. P. Koehler[6], Commissioner of Health of Milwaukee, in a personal communication recently reports that they have given toxin injections during the past year to approximately 9,000 children. In about 6,000 children they were able to complete the series of the 5 or more injections of the toxin. In 6.5% of the cases it was necessary to repeat the fifth dose. He states that about 3% after each injection had severe reactions such as a temperature over 102° F., vom-

iting, joint pains and absence from school for more than one day. In about 1% of the cases the reactions following the toxin injections were unusually severe, making it necessary to discontinue the injections. Approximately, 15% had moderate and 20% mild systemic reactions. Only 13 children out of the 6,000 who had received the 5 doses and yielded a negative Dick test contracted scarlet fever within one year after they were immunized. Dr. Koehler is to report this work at the next meeting of the American Public Health Association at Milwaukee in October.

Some idea as to the increase in the use of the toxin can be obtained from the information[6] furnished by the Scarlet Fever Committee that: the sale of scarlet fever products consumed in 1933 was 130% of the volume consumed in 1932 and the volume consumed in 1934 was more than 155% that consumed in 1933.

Other Methods of Active Immunization Employing the Toxin. The Inunction Method as employed by Martmer[7], and also others, appears to have definite value for the production of active immunity against scarlet fever. He used 5 applications of an ointment containing the equivalent to at least that of the 5 injections of commercial toxin. The ointment was massaged into the skin at intervals of one or five days. He reports that about two-thirds of his group of 155 children, ranging in age from 2 to 10 years, developed within 6 months negative reactions to the Dick test. It is as yet too early to determine the durability or reliability of this method of immunization.

The Nasal Route of Administering the Toxin for Immunization. Friedman[8] and his associates have had considerable success in rendering susceptibles negatives to the Dick test by administering into the nose the toxin by employing an atomizer. He recommends provisionally in children under 3 years of age the equivalent of the 5 doses of the commercial toxin, and in those past 3 about twice that amount. Five inoculations are administered at weekly intervals. His inoculations were not attended by any serious or constitutional effects. He does not, apparently[6], advise it in hay fever patients, or asthmatics or in those having sinus disorders. Such persons may experience rather severe reactions. He states that the attempt was completely successful in 60% and 71% of the children respectively; and that partial immunity was conferred in a considerable percentage of the balance of the group.

Administration of the Toxin by Mouth. Dick and Dick[9] in 1932 were able to produce active immunity in 73.1% of their group of 19 persons in whom massive doses of toxin were administered by mouth. They state that with the exception of vomiting in one case no reactions resulted from this route. However, they did not find this method of immunization nearly as efficient as the injection procedure. At present probably the expense of the large amount of toxin required makes this method impracticable for general use.

CONCLUSIONS

1. The most susceptible age levels for contracting scarlet fever are probably from 2 to 8 years.

2. The series of 5 doses of commercial toxin for active immunization have proved to be the most efficient method.

3. The preponderance of evidence justifies a more extensive use of the toxin for active immunization.

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DISCUSSION

Dr. Ray C. Armstrong, Champaign: There are only two or three facts that I would like to emphasize. The first is the reliability of the Dick test. The Scarlet Fever Commission has reported 20,000 cases known to be negative to the Dick test. None of these people have contracted the disease. Gasul has reported recently among a group of nurses at Cook County Hospital that all those who showed a negative test did not contract the disease at all. Concerning the use of the Dick test in diagnosing scarlet fever and sometimes in the course of the disease, a persistent positive through the course of the suspected disease usually shows that the patient did not have scarlet fever. However, a positive reaction in the early part

of the disease and a persistent negative later usually confirms the diagnosis, though the Dick test is not intended for diagnostic purposes.

The one important thing Dr. Peacock brought out was immunization by the nasal route, which was reported by Friedman of Colorado. Zollers and Friedman, in 1928, first used the nasal route in trying to immunize children against diphtheria. They got nine out of ten negative reactions against it. The skin reaction is very easy to interpret, except it is difficult to give the subcutaneous test in four or five year old children. For that reason, I think the intranasal route will be very successful, especially in some nervous types of children. Friedman emphasized the fact that in using the intranasal route the children should be brought to the office in the afternoon. Have them blow their noses very carefully to remove as much moisture as possible and then give the full dose of Toxoid, allowing them to rest on the back for a short time and then go home and be as quiet as possible, not blowing the nose for some time afterward. His results were very good, 60-80% immunization being obtained.

Dr. Peacock mentioned the fact that adrenalin should be used. A good many of us also use phenobarbital. We try to get the patients in the office about four or four-thirty in the afternoon, give them one-fourth of a grain of phenobarbital and send them home. Later in the evening we give another quarter grain of phenobarbital and usually we get no reaction from the injection. I recall two patients in the same family who developed very severe abdominal reactions after the second injection. We stopped the injections because we did not want to take any chances. If you have a group of patients living in the same neighborhood and they all go through the same thing, it does not help a whole lot. If we can get these injections to the place where we can give them the same as we do toxin-antitoxin, we will be better off.

It is interesting to know the age of susceptibility of these very young children. We think of the most susceptible as being children in either first or second grade. I think the statistics given by Dr. Peacock show a difference, not school age youngsters but ones at quite an earlier age. He also mentioned rural adults. I think anyone who had much experience at the Municipal Contagious Hospital will recall that there were always two or three students from the Coyne Electrical School in as patients. Most of these are boys from small towns or farms where they have had no contact with scarlet fever and built up no immunity, and for that reason we always get them when there is an epidemic of scarlet fever.

Dr. Maurice L. Blatt, Chicago: The purpose of the speaker is the promotion of knowledge of the prevention of scarlet fever. Before entering into such discussion, I think one should more clearly define one's conception of scarlet fever. If one thinks of scarlet fever as a hemolytic streptococcus throat infection primarily, accompanied in some individuals by a skin erythema, then one is in a position to control its dissemination. Diagnosis depends not only upon the skin reaction but upon the finding of hemolytic streptococci in the throat, not in small but in large numbers. Small numbers of hemolytic streptococci are found in the throats of normal individuals rather frequently. If one thinks of scarlet fever as a hemolytic streptococcus throat infection, then one recognizes that one cannot entirely control an epidemic by immunization with the Dick material because there are many individuals with the active organism of the disease in their throats who will not develop a skin erythema. They will not be recognized as scarlet by the average physician. The Dick test is satisfactory. The Dick immunizing material is effective in a large proportion of children, but not in 100% as one might infer from this paper. We have seen a number of nurses at the County Hospital who were at one time Dick negative develop scarlet fever. That brings up the question of the length of time that the Dick immunization protects. We are not in a position to answer this question at this time. I have seen children become Dick negative after five doses of toxin and within four weeks contract scarlet fever. On the other hand, I have one institution housing 250 children under three years of age, the most susceptible group, with a 30% turnover each year. Five years ago we instituted Dick therapy in accordance with the Dick method and we have not had a single case of scarlet fever in this group since. During this year's epidemic of scarlet fever in Chicago, without quarantine in this institution and with daily visitors, not a single case of scarlet fever developed, in spite of the fact that one nurse on duty exposed a whole floor. In this institution, the Dick test has been 100% successful, but it is not 100% throughout the United States.

Dr. John S. McDavid, Oak Park: The recent years have been very productive in regard to finding out things about scarlet fever. Although the Dicks first reported their Dick test about ten years ago, controversy still rages about the specificity of this test. However, as Dr. Peacock brought out, if one observes the technic of making the test and properly reads the test in twenty hours or twenty-two hours, there seems to be very little question about its reliability. In Budapest, Dr. Bella Johns reports that not a case of scarlet fever has been reported in twenty thousand individuals on whom she had negative Dick tests. More recently Rhoades and Gazul have reported that not one case of scarlet fever has been observed in twenty thousand people tested by the Scarlet Fever Committee who had an original negative Dick test. I think it would be worth while to bring out the point Dr. Armstrong mentioned, that as far as the diagnosis of scarlet fever is concerned, probably the Dick test is of very little value. In the report of Dr. Rhoades and Dr. Gazul they found in twenty-four hours that 58% of all patients who developed scarlet fever had a negative Dick test. This work specifically points out that, so far as diagnosis is concerned, the Dick test's only value perhaps is that a person who is Dick positive three weeks after the onset of suspicious symptoms probably did not have scarlet fever. Gazul and Rhoades thought the culture was of the greatest value

in diagnosis. They reported 85 cases of scarlet fever with 100% positive cultures.

The phenomena of infants showing a negative Dick test during the first year is very interesting. It is somewhat paralleled in the first few months of life by the Schick test, though you will find more positive Schick tests in the first few months than you will Dick tests. It is of particular interest, due to the fact that infants' blood contains no scarlet fever antitoxin. One seems forced to fall back to the supposition that the reticulo-endothelial system of the infant is not well developed, and, therefore, does not give a result. It is well known that the infant's skin does not react to many other toxins.

The question of whether it is worth while to try to immunize a child to scarlet fever depends upon whether the results outweigh the reactions, or chances of any serious complications. It is a well established fact that you can take an institution, immunize practically all of the people therein and keep them immunized. In private practice we still hesitate because of the reactions. However, I believe if individuals are selected carefully, care being taken to immunize only those who give a negative allergic history, that one is perfectly safe in going ahead. Some reactions are to be expected. I have not had success in giving adrenalin with the injections. It seems to me I get just as many reactions when giving it as when not giving it.

Many attempts have been made to develop a scarlet fever toxoid. Most of the methods have been similar, but vary in the aging of the toxin, the strength of the formalin and the amount of toxin used. Scarlet fever toxin is remarkably stable; it is more stable than any other known toxin and therefore it has been impossible to attenuate it and still retain the immunizing principle.

About a year and a half ago I attempted to immunize 22 children with rubs. Twenty-five thousand units of toxin was taken up in lanolin. The patient's back was scrubbed with 95% alcohol and the lanolin rubbed into the back until it had disappeared. The attendant wore a rubber glove and five rubs were given, five days apart. A Dick test was done before the applications were started and again five months later. My results are at sharp variance with those of other reported cases, because I had only four children out of the twenty-two who were Dick negative. In general, the Dick tests were not as positive as before the rubs were started. Two of those children have developed scarlet fever since.

In looking up my records in the office I found that 86% of the children I have given the Dick series of injections were Dick negative after the usual five injections. In four out of the group I had to stop giving it because of the severe reactions that developed. It seems to me if a child has an extremely positive Dick he is apt to get a severe reaction. Children with only mildly positive tests will sometimes react severely too, however, and so the size of the Dick reaction is of only relative value. It is my distinct impression that if one were to attempt to immunize all of the children he sees, without careful selection of cases, he would have many very severe, and probably serious, recations.

I would like to ask Dr. Peacock if, in his work, he attempted in the children who had the more severe reaction to cut down the size of each dose and give more shots, and if he did, were his percentages of negative Dicks just as high as if he went straight through the five injections? My personal experience has been negative. If I cut down the size of the injections and gave eight or nine, I was more apt to get a positive Dick than if I went through the five.

Dr. Armstrong mentioned giving phenobarbital and having the patients eat lightly following the injection. I think that is important. I had one child whose mother brought him up for the first injection and he got along fine. The father brought him up for the second and he had a severe vomiting spell that night. That occurred after the third injection. The mother brought him for the next one and said that she had just found out that the father had given the youngster an ice cream soda on the way home as a reward for taking the injection. The child had no further reactions. I think it is important that they eat lightly following each injection.

Dr. Silber C. Peacock, Chicago (closing): Dr. McDavid's question: Is it advisable to subdivide the five doses of toxin for immunization of a patient having an allergic constitution? At times, only, I believe that I have had some results in reducing the severity of the reactions following toxin injections by making two injections, instead of one, of the first, second and occasionally the third doses, administered at intervals of 4 to 5 days instead of a week apart. The cases to be immunized against scarlet fever should be individualized, because not infrequently some persons are encountered that are extremely hypersensitive to the toxin. In such patients it may be advisable to discontinue the toxin injections. Fortunately such persons are scarce. A careful history is a most valuable means for the detection of hypersensitive individuals.

Dr. Blatt's interjection: "One from hearing the paper read should not get the idea that the Dick test is perfect" may be justified. However, the Dick test, in my experience and that of many others, has been an exceedingly reliable test. I have never seen scarlet fever develop in an individual in whom I have found a negative reaction to the test. During the past nine years I have Dick-tested over 6,000 persons. Perhaps some of these with negative reactions to the test did develop the disease. It is my opinion that the number that have contracted the disease, who yielded negative reactions to the Dick test, are well within the range of error due to faulty technique or misinterpretation of the reaction.

I have had occasionally such an experience as this: A person was alleged to have had a "negative reaction" to the Dick test and contracted unquestionably scarlet fever, presenting this interesting phenomenon: the site of the so-called negative reaction was occupied by an area of bright pink erythema. A reasonable deduction in such a situation is that the "negative reaction" had been misinterpreted. Questionable reactions are practically ruled out by the use of duplicate tests.

THE ROENTGEN DIFFERENTIATION OF OSTEOMYELITIS AND METASTATIC BONE TUMORS

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The subject to be discussed, while intensely interesting, is likewise exceedingly difficult and often hazardous. I used the word hazardous for all that it implies, as it places extreme responsibility upon the surgeon and radiologist. To differentiate inflammatory from malignant bone lesions requires considerable experience and a thorough knowledge of radiology and pathology. Koloday has said: "To read and interpret correctly a roentgenogram of a bone tumor, is an art acquired only with wide experience combined with a thorough knowledge of gross pathology."

I am not adverse to candidly admitting that in many instances I have been unable to definitely differentiate neoplastic from inflammatory lesions. While the subject is difficult, there are certain rather well established x-ray findings which are helpful in arriving at a diagnosis.

I think it is imperative that the radiologist avail himself of all the information that can be elicited through a complete history including laboratory findings. It is not fair to all parties concerned to expect the radiologist to make a diagnosis from the films alone in many instances. The difficulty and seriousness of the problem can be readily demonstrated by submitting microscopic sections to competent pathologists. A recapitulation of their reports will often show a wide divergence of opinions. Any one who has had experience with the so-called Ewing's tumors is definitely impressed with the difficulty of differential diagnosis.

From sections, the pathologist often calls the lesion inflammatory. The clinical findings are also confusing, as the patient may have a fever and a leucocytosis, also common in osteomyelitis. Considering these facts, it is only fair to be charitable with the radiologist, who after all, is only reading shadows which are by no means animated.

What are the salient points in the x-ray diagnosis of inflammatory lesions?

1. Infections usually occur in young people, probably more frequently in males than females.

2. The infection occurs more frequently during the active period of a person's life when he is exposed to injury. I do not mean to infer that the infection always starts from an external wound, but the injury often causes a lowered resistance of the part, and the infection localizes at this point.

3. The first Roentgen examination may reveal no evidence of bone pathology. It is inadvisable to take a negative report from the film as final, especially if the examination has been made within the week.

Usually, x-ray changes in bone infections are slow in presenting, and it is safe to say that they do not become manifest until a week or ten days after the infection. The first finding usually reported is bone rarefaction due usually to destruction, but if the film is examined closely with a magnifying glass, the earliest finding is an area of increased density probably due to edema and infiltration of leucocytes.

The clinical findings and local manifestations are of more diagnostic importance during the early stages than the x-ray findings. Another important and fairly reliable differential roentgen finding is the resistance offered by cartilage to the extension of neoplasms.

It is only in the far advanced cases that a malignancy passes through a joint. I have observed only a very few cases when the tumor has destroyed both sides of a joint, whereas the reverse is true in infections.

An inflammatory process may attack large portions of the bone, but usually the lesion is not as extensive as neoplastic lesions. By this I mean the entire circumference of the bone is not destroyed and it is not uncommon to see normal areas of bone in the area of destruction. In our experience large sequestra are rare in malignant bone lesions.

It is much more difficult to differentiate primary bone tumors from inflammatory lesions than it is to differentiate metastatic tumors from bone infection.

The x-ray diagnosis of bone lesions depends upon direct and indirect findings. Usually the direct findings are of more value than the indirect. The direct findings are those seen in the bone and are due either to destruction or proliferation. Bone destruction and proliferation, per se are not pathognemonic of either infection or malignancy, as they are present in both types of lesions. Indirect findings are those seen

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in the surrounding tissues, such as displacement of the surrounding structures.

Whether a lesion is malignant or benign is often judged on the radiographic appearance by the nature of the bony changes—osteoporoses, osteosclerosis, erosion, new bone formation.

The definition of the new bone, if present, as compared with the normal, is important. Often the bone in a tumor will be perpendicular to the shaft or silk like. While these findings are helpful, they are not infallible. Lace like bone formation and perpendicular striations are also encountered in syphilis.

Careful study of the bone from all different angles is important, also stereoscopic films are often of great aid.

A point of considerable importance to establish is whether the lesion extends outward beyond the bone and into the soft tissues. In our experience, lesions which show a mass extending from the bone into the soft tissues are neoplastic and not inflammatory. It must be established that the mass has its origin in the bone and does not originate in the soft tissues and cause bone changes by pressure.

In patients where the bone lesion is at all suggestive of a neoplasm, it is often helpful in arriving at a diagnosis to examine other bones. If there are areas of bone destruction or proliferation in other bones, the chances are these lesions are metastatic.

Osteomyelitis, when acute, usually occurs in young people in the actively growing part of the bone, usually the lower ends of long bones. The disease may be caused by the streptococcus, staphylococcus or pneumococcus. Probably the commonest cause is the staphylococcus aureus.

The fact that there is a very poor anastomosis between the metaphysis and the epiphysis probably accounts for the infrequency with which the infection spreads to the epiphysis. While this is true in the ordinary osteomyelitis, tuberculosis usually attacks the epiphysis, which is a differential diagnostic point. It has been said by some that staphylococcus albus or streptococcus may spread to the epiphysis.

If the pneumococcus attacks the epiphysis, there is usually a pneumonia present or the patient has recently had a pneumonia.

In the early acute stage of osteomyelitis, there are usually no visible x-ray findings and the diagnosis or the operation should not be defined on radiographic evidence. If the clinical findings are apparent they should take precedence. Early destructive bone lesions are microscopic and cannot be seen in an x-ray film. It requires from 7 to 10 days for the changes to become visible in the x-ray films. Before the areas of destruction can be outlined, occasionally an area of increased density can be seen with a magnifying glass, due to edema. At the end of 10 days small areas of bone destruction can be seen in the cortex and medulla. These areas are usually circular but irregular. Following these small areas of destruction, the process will extend, invading the bone and elevation and proliferation of the periosteum will occur.

If the infection is virulent, destruction will extend much faster than repair takes place. As the patient's resistance increases repair will take place and will be in advance of destruction. It is not uncommon, due to the poor blood supply of the cortex, to have large pieces of necrotic bone called sequestra, develop; these areas are present before large destructive areas in the medulla appear. The extent of the lesion depends on the virulence of the infection and on the thoroughness of the treatment. It is not uncommon to see the entire shaft of the tibia or femur involved.

As the lesion becomes chronic, proliferation of new bone appears and areas of new bone can be seen in the area of destruction. Large areas of dead bone often develop and the greater part of the shaft may sequestrate. Usually the amount of blood supply has much to do with the x-ray findings; increased blood supply causes decalcification, decreased blood supply causes increased calcification, and if the blood supply is cut off there will be no changes in the calcification.

Often in an x-ray film one can venture an opinion as to whether a fragment of bone is dead. If the piece of bone remains of about the normal consistency in a decalcified field, it is quite safe to say the fragment is avascular.

The significance of the density of bone shadows is important and the radiologist's approach is the converse of the pathologist's: the radiologist interprets the decalcification as evidence of an increased blood supply.

In chronic osteomyelitis, localized abscesses often develop. These areas are usually circular and have a soft center and a rather definite periphery, which may be thick or thin depend-

ing on the chronicity. The organism is usually of low virulence and the high resistance of the patient allows very little extension and the area becomes circumscribed. The cortex and periostum are very seldom involved. These abscesses usually occur in the ends of long bones and occasionally they develop in the body of a vertebra. The articular surfaces of the vertebra and the intervertebral discs are usually uninvolved.

Roentgen findings are greatly distorted following operation and often it is impossible to give an accurate diagnosis. This is particularly true when a Ewing's tumor is present. The complete removal of a large piece of cortex may simulate bone invasion which is an important diagnostic point between osteomyelitis and neoplasia.

Following irradiation changes occur in bones, depending on the amount of irradiation. If the dose has been large, necrosis may occur, and if the dose has been small, bone proliferation occurs. I mention these points to emphasize the importance of a history.

The sclerosing type osteomyelitis of Garre is not common but is occasionally encountered especially in the femur and humerus. The x-ray films present a dense homogeneous bone. The process usually involves the upper half of the bone and usually the medulla is obliterated. This type of lesion is not as a rule difficult to diagnose, but may occasionally be confused with marble bone (Osteopetrosis or Ewing's tumor).

From our experience we believe the most important differential finding is bone invasion. While I know invasion of the cortex occurs in osteomyelitis, I think it is rare to have normal bone intervening in a malignant area of invasion, whereas in osteomyelitis it is common to see normal bone growing in an area of invasion.

In our experience we have found it more difficult to differentiate osteomyelitis from primary neoplasm than from metastatic tumors.

After all points are carefully considered, it is difficult to accurately differentiate bone lesions and in many instances it is impossible and multiple microscopical sections must be studied.

Certain primary tumors are prone to cause metastatic bone tumors, namely: carcinoma of thyroid, breast, hypernephroma and prostate. Tumors of the gastrointestinal tract are less frequently followed by metastatic tumors as these patients usually die before metastasis occurs.

Metastatic tumors are usually blood borne, except in cases where there is local extension. We believe that metastatic tumors of the pelvis following carcinoma of the breast are hematogenous, as it does not seem reasonable to assume that such a lesion could be lymphogenous.

From our experience, metastatic lesions distal to the knees and elbows are very rare. After puberty there is practically no red bone marrow in bones distal to the elbows or knees. Piney contends that all bone metastases occur in cellular red marrow which accounts for the frequency of such deposits in the ribs, vertebrae, skull, sternum and the upper ends of humeri and femora.

The preponderance of evidence at this time seems to favor the claim that bone metastases are blood borne. Professor Handley regards the infrequency of metastasis in the distal limb bones as evidence in favor of the lymphatic permeation theory, claiming the nearer the bone to the primary growth, such as carcinoma of the breast, the greater the tendency for mestatasis. This theory however, does not explain femoral metastasis from a carcinoma of the tongue, or humeral deposits from carcinoma of the rectum or urinary bladder.

Metastatic carcinoma, may be divided into three types, namely: 1. Osteoblastic. 2. Osteoclastic. 3. Combination of the two.

Osteoblastic types are usually slow growing and cause increased density of the bones. This type of mestastasis is not as common as the osteoclastic and usually follows carcinoma of the prostate and occasionally scirrhus carcinoma of the breast and carcinoma of the cecum. The patient with osteoblastic metastasis usually lives longer than the osteoclastic type and has less pain. The x-ray findings are quite typical, causing a sclerosis of the bone, usually homogeneous, with no increased trabeculization nor widening of the bone.

Frequently with carcinoma of the prostate, circular homogeneous nodular areas of increased density can be seen in the pelvis.

Occasionally the osteoblastic type of metastasis is confused with Paget's disease. The increased trabeculization in Paget's disease is characteristic.

The osteoclastic type of metastasis is the commonest type and is characterized by bone destruction. Multiple worm eaten areas, small at first, are usually seen. These areas grow, often

rapidly, and to a large size, frequently destroying the entire circumference of a bone. The femur for example, may show an area through the shaft completely destroyed. The edges of these areas are usually irregular in contrast to myeloma.

The areas usually occur in the region of the nutrient artery. Cartilage is resistant to the progress of neoplasm. In the body of the vertebra, the collapse of the body is usually a late finding, due to the firmness of the tumor. The articular surfaces are only invaded very late in the disease.

It has been our experience to find lesions which pass through joint surfaces inflammatory, and we always consider them as such until proved otherwise. Another important finding is the usual multiplicity of bone lesions when due to metastatic tumors. It must be remembered however, that inflammatory lesions may produce multiple bone lesions. The history is of great value in determining the nature of the lesions. It is often difficult and occasionally impossible, to differentiate a rapidly growing sarcoma from a single metastatic carcinomatous tumor. If the sarcoma is of the small round cell type, which is very malignant (malignancy usually varies inversely with the size of an individual cell) the bone may be entirely destroyed, the same as occurs in an osteoclastic metastasis. The patient should be completely examined and the bones rich in red marrow radiographed and usually, if not at the first examination, in a short time other lesions will be identified. Pathological fractures through neoplastic tissue, whether primary or secondary, are quite common.

THE SURGERY OF BONE TUMORS

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In considering the treatment of bone tumors it is necessary to know first that we are dealing with a tumor and second whether it is benign or malignant. From this information we decide whether the treatment shall be conservative or radical. We must also know the variety of benign or malignant tumor, as this further aids in determining the treatment. In case of benign tumors we may leave small lesions alone or treat others by excision or x-ray. In the case of malignancy, we may treat by radical surgery or by radical x-ray, according to the variety of the lesion.

Of the benign tumors, osteoma is the commonest. There are two varieties, the cartilaginous osteoma or exostosis and the fibrous osteoma. Cartilaginous osteomas are met with on the bones of the trunk and extremities. They are usually nodular protruberances about the ends of the shafts and are capped by a layer or by islands of cartilage through which growth takes place. Most frequently they are single, but there are cases in which the condition is multiple and the tendency to run in families is marked. Cartilaginous exostoses are ordinarily removed only when they are of sufficient size to produce objectionable deformity or interference with function. If they are chiselled through at the base so that all of the cartilage cap is removed, they do not recur. A small percentage of cartilaginous exostoses change into chondrosarcoma, and since the risk of removal is ordinarily very small it is a question if all single exostoses and large multiple ones should not be removed by operation to prevent the possible development of malignancy.

X-ray treatment of the cartilaginous exostosis has been shown by Druckman to arrest the growth of the tumor and cause rounding off of its superficial portion. While this form of treatment should not be employed in preference to operation in the young, because of the liklihood of x-ray interference of longitudinal growth of the shaft, it might be used with success in adults in case there is continued growth of the tumors.

Fibrous osteomas arise almost entirely in the bones of the head that are preformed in membrane. They may spring from the outer or inner table of the skull and not infrequently from the wall of the frontal ethmoidal and maxillary sinuses. Excision of cranial osteomas may be indicated in case there are symptoms of pressure on brain or external deformity. Sinus osteomas may lead to obstruction and infection and osteomyelitis of the osteoma may lead to sequestration within the bony cavity. Operative removal may be difficult because of inability to completely excise the tumor, but it is often necessary in order to get rid of the infection in the sinus.

Osteoma of the jaw may be single, but in some instances both upper and lower jaws are in-

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volved. Sometimes the lesion is circumscribed and may be completely excised. In other cases the bone is diffusely infiltrated and only partial excision is possible. But as a rule excision should be carried out. It is important to know that x-ray treatment materially restrains growth of fibrous osteomas, whether in skull or jaws, and it should be used postoperatively when the tumor has been partially excised or when operation is contra-indicated because of inaccessible location. I have seen the remaining tumor held in check for many years by irradiation, both in the case of cranial and jaw osteomas.

Chondromas rank next in frequency to osteomas. They are located especially in the phalanges of the hands and occur as single tumors. The pedal phalanges are rarely involved. A single central destructive lesion in a finger bone proves to be a chondroma in the great majority of cases. It may be successfully treated under local anesthesia, by excision of a window, thorough curettage of the cartilaginous interior, cauterization with phenol, and closure of the wound with the bony cavity filled with blood. Single chondromas are rarely seen within the ends of the large bones of the extremities, tumors so situated being either benign giant cell tumor or solitary cyst. Multiple cartilaginous tumors in the ends of the bones of one or two extremities are occasionally seen in the picture known as Ollier's dyschondroplasia. Such lesions may call for local treatment in case they produce deformities as in the hand. Chondromas are more likely to become malingant than exostoses or fibrous osteomas, and for that reason should be treated by operation. Chondromas of the ribs are not uncommon and are especially inclined to change to chondrosarcoma. Benign giant cell tumors are met with very largely in adult life, as contrasted with solitary cysts which are seen most frequently in children. When located in an extremity they are best treated by the application of a constrictor, excision of a window of cortex for the entire length of the lesion, thorough curettage, swabbing with phenol, neutralization with alcohol, filling the cavity with salt solution and tight suture of the soft parts followed by removal of constrictor and plaster of Paris immobilization. Moderate x-ray therapy should be applied as soon as the wound is healed and temporary cast removal is feasible. This results in a high percentage of cures, whereas operative treatment only, or x-ray treatment only is followed by a fair percentage of recurrences. If there is recurrence in the face of combined operative and x-ray treatment, malignancy should be suspected and the lesion biopsied again. I have had one instance of sarcoma developing twelve years after radium treatment of benign giant cell tumor with apparent cure. Hemangioma of bone is relatively common, but in the great majority of instances a vertebra is involved, the lesion is small and no symptoms result from it. Occasionally the spinal cord is compressed and in such cases it has been shown by Bucy and Capp that x-ray treatment will usually control the lesion and result in disappearance of pressure symptoms. Hemangiomas in the extremity bones usually produce a characteristic sun-burst effect in roentgenograms which makes their diagnosis possible. Recent experience, as that of Capp and Bucy has shown that the lesion may usually be controlled by x-ray treatment. However, in certain cases excision may be advisable. Little is known about malignant degeneration of hemangiomas.

Malignant Tumors. In general, malignant bone tumors in the limbs, regardless of the variety, should be treated by amputation when there are no evidences of metastases. The single exception to this rule is perhaps the Ewing tumor, or undifferentiated round cell sarcoma. Experience has shown that by the time the diagnosis of this lesion is established metastases already exist and that amputation is followed by the appearance of lesions elsewhere within a short time. Consequently the best treatment for them is irradiation therapy, since the response is usually striking, both in case of the primary tumor and in case of the earlier metastases. Osteogenic sarcomas are lesions showing tumor ossification and the response to x-ray treatment is usually negligible. On the other hand, amputation results in a five year cure in at least fifteen per cent. of the cases. Chondrosarcoma is more amenable to x-ray control. I have one patient on whom x-ray treatment was started four years ago for a large chondrosarcoma of the ilium. It has increased only slightly in size and has undergone a considerable degree of ossification without showing evidence of metastases up to the present time. However, experience has shown that metastases ultimately result and that operation when feasible gives the best results. Fibrosarcomas and angiosarcomas also respond poorly to x-ray treatment and when lo-

cated in the extremities they call for amputation. Sarcomas of the trunk bones should be treated by wide excision whenever possible; otherwise by irradiation therapy. Sometimes the tumor may be inoperable at first but after x-ray treatment, with shrinkage of the growth, excision becomes feasible. Nine years ago I biopsied such a case of round cell sarcoma of the clavicle. It was then treated by x-ray with subsidence of the tumor. Six months later I excised the clavicle with the adjacent soft parts and the patient has since remained free from recurrence. Local excision of an involved extremity bone with replacement by a bone transplant is an unjustifiable procedure, as recurrence of the sarcoma has nearly always been the result,

REPORT OF A CASE OF BONE TUMOR

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Since the time in 1860 when Nélaton published an exhaustive monograph, the literature on bone tumor has become very voluminous, and especially has it piled up since the study of bone by means of the x-ray. This latter method of bone study is recently credited with being the most important one when employed by a roentgenologist who is fortunate enough to have had good medical and surgical experience.

Kirklin and Moore say that the roentgenologic study is not single but dual, those showing trabeculation and those not. In those not showing trabeculation, differential diagnosis is to be made principally from enchondroma and bone cysts. The first expand the bone cylindrically. Cysts are not trabeculated and enchondroma spring usually from the small bones of the hand.

Baetjer and Waters' method of analyzing bone tumors consists in taking four points as a basis of classification, viz:

1. Origin of tumor.
2. Presence or absence of bone production.
3. The condition of the cortex.
4. Invasion.

They suggest that this is a rough outline for analysis and that if two of these points can be established they frequently lead to a correct diagnosis.

For a basis of Roentgen diagnosis the following historical study is also added. Tumor can be caused by a disturbance of

1. Nutrition.
2. By infection.
3. By trauma.

The case which is to be reported is considered as resulting from trauma and was diagnosed as a giant-cell tumor.

Kirklin, Pierce, Coley and Pfaehler have recently published articles in which they have reported findings in 206 cases. These, of course, do not cover a complete search, but is a sufficient survey to govern the frequency as to involvement and which show 17 of the ilium or a little over 8%.

The age incidence in this particular anatomical location is more frequent under thirty years of age. (Third and fourth decade of life.)

Sex incidence in these reported series indicates that males are more liable than females in about a two to one ratio.

Kirklin quotes Codman as stating that the average pathologist sees but ten in a life time. Since, my diagnosis of this case as being a giant-cell tumor is a rather bold one, and was made for the purpose of instituting treatment and not for statistical use and is presented for the purpose of eliciting discussion, I feel bound to agree with the conception that giant-cell tumors are not always differentiated by roentgenograms, and not wishing to bore you with padded quotations, please refer to recent exhaustive reports of Ewing, Geschickter, Codman and others for diagnostic differences, and for treatment to Pfaehler, Groover and Christie, Herendeen, Evans and Leucutia and Coley.

In the event of trauma the vitality of a part can be completely destroyed if sufficient in intensity to arrest the circulation of body fluids and of such a character as to prevent a return thereof. The skin can remain intact while the deeper tissues are crushed, as for instance a heavy body passing over a foot. A blow over a part where only a thin layer of tissue intervenes between skin and bone may loosen the periosteum. Following trauma the process of repair is immediately instituted by nature and simulates considerably the normal program of bone waste and repair which is constantly taking place in bone as well as in other tissues. Normally this process is very slight but becomes speeded up in the presence of pathology. Should there be a concomitant regressive disturbance of nutrition, in-

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terference with the histological function of the osteoblasts or osteoclasts will result in imperfection in repair and tumor cells will be the probable result. This being particularly true in weight bearing bones if the load be great and continuous. The process may extend over a period of years with remissions and exacerbations suggesting that repeated roentgenograms be made in a follow up.

Case History: L. E., aged 17 years, raised on farm. Parental history essentially negative. Had usual childhood diseases, measles, scarlet fever, with no complications. Developed normally of height and weight within standard limits. Had appendicitis at 15 years of age with uneventful recovery. In the fall of 1932 while playing ball was struck by a line drive over left ilium, incapacitating him. The skin was not broken and the swelling but slight. In two weeks he seemed well again, but in six weeks he complained of pain in left hip extending down the leg. He was taken to an osteopath, who succeeded in two months in putting the boy in the hospital unable to walk and in severe pain, with decided increase in size of tumor and increased swelling. The chronic swelling was aspirated, but only thick blood obtained. This was probably the muco-jelly spoken of by older writers. Left ilium seemed to be thickened. Swelling was semi-fluctuant.

Temperature	98°
Basal Metabolism	+31
Erythrocytes	5,050,000
Haemoglobin	85%
White Corpuscles	8,200
Neutrophiles	60%
Small lymphocytes	32%
Large lymphocytes	8%

After a week of morphia he was turned over to me for diagnosis and suggestions for treatment.

On the basis of at least a tentative diagnosis of giant-cell tumor he was given Roentgen therapy with almost immediate relief from pain.

In two weeks he was walking, but with a decided limp. In two months he was not in any kind of distress, but continued with a slight limp. In eleven months he was as active as ever and was allowed to enter a golden gloves contest. He reached the semi-finals and was knocked through the ropes, but suffered no injury from the bout and started at it again.

Several months later he was put at tile ditching. After being at this a week a cave-in doubled him up, resulting in injury to the same hip. Probably because the parents still owed me he was taken to one who placed him in a cast which became tighter and tighter and in ten weeks the boy died. I did everything possible to obtain an autopsy, but was informed that death resulted from sarcoma.

I feel sure that I have seen three other cases in my own work and being very much personally interested in this boy I visited bone clinics and libraries, and consulted monographs and the experience has suggested the conclusions which do not differ from others, viz:

Intensive expert Roentgen study, with conferences with consultants in order to obtain a true concept of the patient.

Give patient the benefit of any uncertainty by instituting Roentgen therapy since the least that can be expected is restraint of growth.

Avoid biopsy because of danger of breaking down defense mechanisms.

No doubt some failures to perform a cure can be attributed to a panicky or economic psychology resulting in an interruption of the program for attacking the problem.

Danger of Roentgen therapy to surrounding tissues is slight if thoroughly understood.

To quote Pierce: "Roentgenology in the case of persons suffering from giant-cell bone tumor has reached sound and definite conclusions."

DISCUSSION

Beveridge Moore (Chicago): Mr. President and Members of the Society: I am very sure we couldn't find any two men more competent to discuss this question of bone tumor than Dr. Phemister and Dr. Jenkinson from the different viewpoints they have shown. There is not much I can add to what they have already said. There are one or two things I would like to accentuate, however, if it is possible to do so. In the first place, Dr. Jenkinson said we must not depend too much on x-ray diagnosis alone. I believe that is quoting him fairly accurately. I think we all agree that the diagnosis of malignancy cannot be made on x-ray alone. We must take the clinical history and the clinical findings, also the pathological findings, into consideration. I notice, in addition to that, the pathologists are now beginning to be a little cagey about committing themselves on a definite diagnosis. They also want to know what the roentgen findings were, what the clinical history was and the clinical findings before they will commit themselves to a diagnosis.

One point which Dr. Phemister mentioned needs to be emphasized as much as we possibly can do, which is that the main thing in the early diagnosis is to know whether it is malignant or whether it is not malignant. In this important differentiation, we need to take all these clinical points into consideration.

There are a number of things which we must take into consideration. One is the early symptoms of malignancy; multiplicity of lesions usually point against malignancy unless it is metastatic carcinoma. In that case, there may be multiple lesions, but in sarcoma it is usually a localized lesion in one place. The speed of the growth of the tumor is another point we must take into consideration. Some of these sarcomas are very rapidly growing things. They will increase almost over the weekend. I should like to illustrate what I have to say from a collection of cases,

all except one of which are taken from Shriners' Hospital. One is the case of the old, not common but not uncommon, osteomas, a non-malignant type. It might be suspected of being malignant because it showed a great many lightened areas at the back of the thigh. It was a nuisance because it hurt when he sat down; there was no pain otherwise. There were a number of other tumors, including those on the forearm. They were excised because they were interfering with motion. We didn't think it was malignant. It was ordinary everyday bone tissue when we got it out.

We had one case which had some features which made it look as though it might be malignant; it was multiple, which speaks rather against its being malignant. It looked as though it might have been cystic. As a matter of fact, when we did a biopsy, partly to get a biopsy and partly to correct the curve in the femur, we found it was cystic. We found little white things like sand and gravel. We took them out; you could crumble them in your fingers. When we got the section, instead of being malignant or instead of being a plain, ordinary cyst, it showed pure chondromatous tissue, nothing but cartilage. It is the second I have seen which has had the same findings, granular stuff loose inside which turned out to be a calcium salt. I am not sure but what they may represent one evolution of an enchondroma. It became cystic and calcified. It may represent sort of a benign evolution of an enchondroma.

We had a man forty-six years old who had little pain. He had one severe attack of pain but very little. The attack of pain had been about six weeks before the x-ray was taken. If the attack of pain represented the time it began to any extent, it had grown rather rapidly, but the absence of pain was confusing. It looked almost as though it had been benign, some type of infection. We did a biopsy and found it was a fibrosarcoma. There is a mass in the x-ray and you can see it has broken through the cortex of the bone. It is barely possible when that broke through it represented the attack of pain. The fibrosarcoma is eating away the bone and in places has left a little island.

Another case illustrated was rather an innocent looking thing radiologically. The patient was practically moribund when she came to the hospital. In addition to what was evidently an osteogenic sarcoma, she had metastasis in the lung and died a very few days afterward. Although it was rather an innocent looking affair, it had a fairly good defense reaction in the bone around it, some destruction, and evidently an osteogenic sarcoma. I don't know the particular type.

We had a case that turned out to be a round cell sarcoma. The youngster lasted about three months. There was a fair amount of defense reaction, one of the old sunburst type. The case had not been treated by x-ray when we saw it. The parents were unwilling to listen to even a biopsy and the child was taken to another hospital where it died. At the autopsy it showed the usual findings.

Rather an interesting case that brings out a number of different points was that of a boy who came to the hospital with a diagnosis of tubercular spine with paraplegia. He had a kyphos with some destruction of one of the bodies of the vertebra, but the destruction did not look exactly like tubercular destruction. There is simply a plate of bone left. There were little areas of spongy bone evident in the lamina and some in the spinous process, as it turned out later, of the vertebra. We watched him a while. These became a little harder, with no marked change in size. It was decided to do a biopsy. We did the biopsy, taking a section out of the spinous process and out of the lamina of the vertebra. These portions were divided into three different pieces and taken to three different pathologists, all extremely competent men. We have two entirely different diagnoses and a third in the offing which is also different but has not yet been officially rendered. Any of the men know what they are talking about, but the case simply indicates the difficulty in diagnosis. In this case a section of one portion showed beginning cystic formation with some fibrous infiltration, with some of the bone left in, diagnosed osteofibrocystica. A different portion showed what was diagnosed as hemangioma. The pathologist who diagnosed this as hemangioma and the pathologist who diagnosed it as osteofibrocystica traded sections and each agreed the other man's diagnosis was right. The two sections couldn't have been over a quarter of an inch apart at the outside and yet showed utterly different fifindings. It simply illustrates how we have to be careful in our diagnosis and in our conclusions. Even the most competent pathologists make different diagnoses because the tumor itself will differentiate in different portions which are very close together.

Dr. Fred H. Decker, Peoria: This symposium on bone tumors has again, as usual, shown us how little we actually know about primary malignant bone tumors. The relatively low percentage of cures cited by Dr. Phemister makes us realize that a great deal needs to be done in the direction of treatment. Today, however, we have been extremely fortunate in having such splendid papers presented by men who have not only had a large amount of material to work upon but have had the ability and means to make the most of it. Dr. Jenkinson showed us some fundamental ideas in the diagnosis of bone tumors. Pfahler, some time ago, said diagnosis was of the greatest importance and apparently, from the trend of the remarks today, diagnosis is still the thing that everything hinges upon.

It is a question in my mind how many amputations have been done on tumors which were possibly benign; on the other hand, there have been many malignant tumors that have been classed as benign and, when the true condition was found, it was too late to do the patient any good. I frequently think of the report by Dr. Codman of the first 148 cases which were submitted to the registry of bone sarcoma. Of the 148 cases, eighty-two or 55% did not come under this category. Over half the tumors that had been submitted as bone sarcomas eventually were not bone sarcomas. The original lesion that caused Codman to institute this organization of bone sarcoma eventually proved to be a cancer from other than bone; in other words, a metastatic lesion. The diagnosis, then, is

important and it is sometimes extremely difficult for the surgeon with the wound open before him or for the pathologist with the slide before him to make the correct diagnosis, as has been pointed out so ably by Dr. Moore.

While we should not depend entirely on roentgenograms, it is true a correlation of these may help us on the way. One reason, as Dr. Moore also pointed out, is the fact these tumors have so many points in common. As he said, one area in a tumor may present one pathological picture and another era an entirely different picture. These tumors all originate from a cell which is supposed to be a forerunner of all the types of tissue that forms bone, that is cartilage, fibrous network of bone and the bone itself. All of these different types of tissue are usually present in some proportion. One may be present a great deal more than the other, but still all are present to some degree. The real criterion on the activity of a tumor is not so much the type of cell as it is in the number and quantity or quality of the undifferentiated cells.

If diagnosis is so extremely difficult, I believe it is essential that time be taken in making a diagnosis. If this be done, the interval of waiting may be advantageously used by instituting therapeutic irradiation, either x-ray or radium. By that I do not mean to infer that all tumors should be treated by x-ray or radium, but I mean that x-ray or radium should be used in the interval between the time that the patient is first seen and until actual diagnosis is made and until amputation or whatever type of surgery is used is finally decided upon.

It is obvious that a certain type of tumor, such as the osteogenic type of sarcoma, is not going to yield very much to x-ray. Basically, we know that cells that are as well differentiated as they are are not usually very rapidly growing, nor are many divided cells present; hence they are not going to give us very much x-ray reaction. But in those cases, since they are not very rapidly growing, time itself is not so great a factor. In a tumor which is a rapidly growing tumor, the x-ray or radium will frequently be more effective. I believe eventually there will be a combination of x-ray and surgery which might involve the use of the newer methods of irradiation in single small doses, but greater total doses delivered over a longer period of time.

I was very much interested in the case which Dr. Grote showed us. The question came to my mind as to how much reaction he got after his x-ray treatment. By that I don't mean the reaction in bone itself, but I was interested particularly in the clinical reaction. Some cases in the literature report that some weeks after treatment to giant cell tumors the skin becomes very red, not x-ray redness but a definite redness due to the effect on the tumor itself. This is occasionally accompanied by a great amount of swelling. I would like to hear Dr. Grote make some remarks about that. I enjoyed the presentations immensely.

Dr. Edward L. Jenkinson: I want to admit definitely I do not think we are trying to put the x-ray diagnosis in a bad position if we really admit there are a great many of these tumors we cannot diagnose. I would like to ask Dr. Phemister one question. I would like to have his opinion, from his experience, as to how common primary bone tumors really are. While I was connected with three rather large hospitals in Chicago I do not believe I saw on the average over one primary bone tumor a month. I think each one of those tumors I saw was observed by practically every member of the staffs of the three hospitals. Probable eight or ten of the men had five by sevens or slides made of each one of the tumors. I am wondering whether all these tumors we are seeing have not been reported four or five times by different men, and that we are reporting the same tumor several times. I would like to hear from Dr. Phemister as to how common he thinks primary bone tumors are.

I did not intend to speak about the roentgen therapy of bone tumors. Personally, I think bone tumors as a rule are highly differentiated and I do not believe highly differentiated tumors usually respond well to roentgen therapy. With those tumors that do respond, I do not think you have to take the skin off and destroy all the tissue. With those tumors that do respond and those that do not, it has been my experience, no matter what I did for them it did not seem to make much difference in the ultimate result. There are three cases which I can call to mind who are alive after ten years, not including the one that Dr. Phemister reported. One was a young girl who was a nurse at the hospital some ten years ago, who had a primary tumor of the proximal third of the fibula. I thought it was a giant cell tumor. Dr. Halsted removed it grossly. Dr. Le County looked at the section and it was a malignant osteogenic sarcoma. The patient had some irradiation after removal and is still alive. Two others of the same condition, all alive, were subjected to surgery.

Dr. D. B. Phemister, Chicago (closing): I have no definite statistics on the relative frequency of primary and secondary malignancies of bone, but in general the great majority of skeletal neoplasms demonstrated in the average x-ray laboratories are metastatic carcinomas.

I neglected to speak of excision of early sarcomas of bone in the extremities. In general I believe the practice is a bad one. In a few cases I have excised tumors and transplanted bone to the defect, but there has always been recurrence and I do not believe that the procedure is justifiable except in very rare circumstances. I think that the most likely diagnosis in Dr. Moore's case is that of hemangioma of the spine and the extensive collapse of the vertebra with cord compression raises the question if tumor has not been transformed to a hemangio-sarcoma.

Dr. Grote: The patient to whom I referred was treated not according to the Coutard method but was given 400 "r" in the first four weeks. At the end of that time there was some reaction. We held a little conference in regard to it and just thought it was reaction, but kept on treating. The swelling disappeared and the patient went on to improvement, as noted in the paper. The reaction was not severe; however, there was some.

HEPATO-DIAPHRAGMATIC INTERPOSITION OF THE COLON; REPORT OF A CASE

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Anomalies of the colon either developmental or acquired are usually of academic interest only. There occasionally occurs a variation from normal to which clinical significance may be attached. Hepato-diaphragmatic interposition of the colon, whether temporary or permanent, may be classified in this group. A case of permanent incarceration of the colon in the subphrenic region stimulated our interest in this seemingly unusual condition.

The first description of interposition of the colon was that of Cantani[5] in 1865. Beclere[2] in 1899 described it radiologically. In 1905 Cohn and Meyer[8], and in 1908 Weinberger[26], published accounts of cases of this type. But not until Chilaiditi[6] in 1910 reported three cases of temporary interposition had a thorough survey of the field been undertaken. Weiland[27] published a case in 1915 which was diagnosed as abscess preoperatively, but which proved to be interposition of the colon.

In 1922 in his book of radiological diagnosis, Assmann[1] discussed displacement of the colon in a case of atrophic liver of luetic origin. Three years later Burger[4] published three cases of partial dislocation of the liver lobes due to shrinking of the duodenohepatic ligament, thereby allowing subphrenic fixation.

Dehn[9] in 1926 reported a case in which the right liver lobe was small. In the next year Podkaminsky[18] discussed the pathogenesis of interposition of the colon in connection with a report of two cases.

The largest group of cases reported was that of Uspensky[24] in 1928—eight permanent and fourteen temporary instances of interposition of the colon. In the same year Gianturco[13] reported a case of interposition which was treated surgically.

In the literature there are reports of cases diagnosed clinically by Meissner[17], Chvosteck[7], Winkler[29], and others. Interposition of bowel between the liver and anterior abdominal wall in cases of general Glenard's disease were reported by several including Bonnet[3], Frerichs[12], Landau[16], and later Rosenfeld[19].

Emil Just[14] in 1929 reviewed the literature carefully in connection with the report of three cases. Two cases were of intermittent interposition and were not operated upon. One case was treated surgically. The next year Soupault[21] described an instance in a patient with duodenal diverticulum and perforating duodenal ulcer. Two cases of hepatoptosis with hepato-diaphragmatic interposition of the colon were reported by Tremolieres and Pierron[22] in 1930. The seventeen cases reported by Tremolieres and Tardieu[23] in 1931 in practically every instance indicated certain etiological factors prevailing throughout the series. In connection with his treatment of cases of pulmonary tuberculosis Slavin[20] recently reported two cases of interposition of the colon following phrenectomy.

Case Report: H. S., No. 4464, aged 58 years, male, married, European, Jewish, shoemaker. The patient was admitted on 8-14-34 complaining of "stomach trouble" of many years' duration. There had been recurring episodes of upper abdominal "uneasiness," anorexia, weakness and associated weight loss. "Gas" and bloating were prominent symptoms. In 1929 such an episode supposedly resulted in rather marked exhaustion. Abdominal exploration (elsewhere) through a left rectus incision was reported as having disclosed nothing significant. The patient gained weight thereafter and was noticeably improved for a short time. Reappearance of the old symptoms in a very greatly exaggerated form compelled the patient to stop work and seek medical advice again.

Physical Examination: B. P. 180/110; p., 80; T., 98. The patient was poorly nourished and very asthenic; facies haggard. The chest was long and thin, the epigastrium flat, and the abdominal muscles weakened. The costal angle was acute at the sternum. The left rectus scar in mid-abdomen was healed. There was a tympanitic note in the area of normal liver dullness. Reflexes were normal.

Laboratory: Examination of the urine gave negative results on several occasions. The hemoglobin content of the blood was 92%; lymphocytes, 33%; monocytes, 3%. The Kahn reaction of the blood was negative. Gastric analysis showed total acidity 40 and free hydrochloric acid, 5. Roentgenologically, the gall bladder was normally functioning. The presence of gas in what appeared to be an unusually high lying loop of colon prompted its further examination (Fig. 1). The right colon was visualized high in the right subphrenic region (Fig. 2). The stomach was of "cascade" type.

Diagnosis: The diagnosis of interposition of the colon between the diaphragm and liver was made.

Preoperative Treatment: Preoperatively, the patient was placed upon a low residue diet for five days. Fluids were increased. Activity was restricted moderately.

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The patient was given three series of high colonic flushings for two days before the operation.

Surgery: On August 29, 1934, the patient was submitted to surgery. The liver was about three-fourths that of the normal sized organ and was markedly ptotic. The color and general outline were normal. The stomach and duodenum were normal. The gall bladder was large, green-blue, and contained no stones. The transverse colon was elongated and the mid and right portion was found adherent to the dome of the right side of the diaphragm and to the upper surface of the right lobe of the liver (Fig. 3). The colon seemed normal otherwise.

Fig. 1. Cholecystogram in which high lying loop of colon is visualized as aerogram.

Fig. 2. Radiogram showing elongated and distended transverse colon completely filling the right diaphragmatic dome and displacing the right liver lobe.

Technique: An exaggerated incision as for cholecystectomy was used. The adherent colon was freed by blunt and sharp dissection. Several interrupted chromic sutures were taken in the longitudinal band of the colon and fixed to the anterior parietal peritoneum about the level of the umbilicus. The falciform ligament was divided and shortened by sutures in such a manner that 4 cm. of the ligament was available for use in joining the ptotic liver margin to the lower border of the costal arch. Interrupted braided silk sutures were used in fixing the liver margin to the falciform ligament. The upper border of the falciform ligament was then sutured to the costal border. The peritoneal folds at the margins of the gall bladder were utilized to bridge the gap between the liver and costal arch for from 4 to 5 cm. The remaining space lateral to the gall bladder was closed by braided silk mattress sutures deep in the liver tissue and attached to the costal margin. Iodoform gauze was placed between the diaphragm and liver in several places where the space between the sutures would allow. A Penrose drain was placed at the Foramen of Winslow.

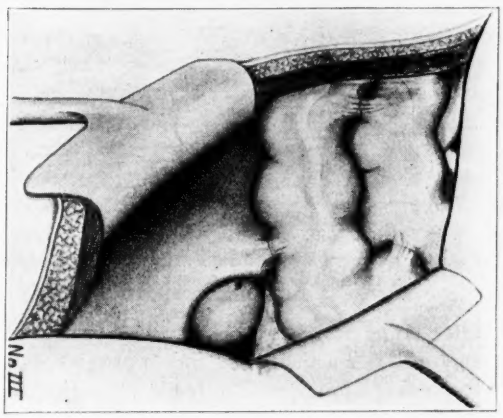

Fig. 3. Diagrammatic sketch showing the interposed, adherent portion of the transverse colon.

Course: Postoperatively, the patient lay perfectly flat for three days; the foot of the bed was then elevated a few inches, for the purpose of removing some of the tension from the hepatic sutures. By the fifth postoperative day the temperature and pulse and respiration were normal. There was considerable pain along the right costal margin for a few days. The Penrose drain was removed on the third day and the iodoform gauze packing was removed on the fourth day. Water was taken by mouth in twenty-four hours. A full bland type of diet was taken on the seventh day postoperatively. The patient was up on the twelfth day and was able to leave the hospital two days later, but he preferred to remain a few days longer just "to be sure."

The patient appeared at the clinic for observation two months later and reported no gastrointestinal complaints, a gain in weight and that he was working every day. The examination of the colon by clysma showed it in good position (Fig. 4).

Anomalies of the colon according to the observations of Kanter and Schecter[15] may be those of length, rotation, descent, and fixation.

The colon must be of sufficient length and mobility to reach the hepatodiaphragmatic region. Most observers in reporting their cases have noted the increased length of the transverse colon. From Vietor's[25] research it would appear that distention of the colon causes it to have a tendency to rotate on its mesentery, there-

Fig. 4. Radiogram two months after operation showing the colon in excellent position.

after rising and presenting greater prominence anteriorly. Furthermore, the transverse colon may swing upward and be found projecting forward at any agle up to the vertical.

In addition to the meteoric colon, many observers emphasize the factor of some type of inflammatory process. A perforating duodenal ulcer was present in Soupault's[21] case. In Tremoliere and Pierron's[22] cases the colon was dilated above the adhesions, making it appear that the adhesions formed in conjunction with a pyloric ulcer, and the subsequent distention pushed the intestine into the bizarre position. Tremoliere and Tardieu[23] added further evidence supporting this contention in the report of their cases in which the interposition of the colon was associated with chronic inflammation and the formation of pericolic adhesions. The resulting distention of the colon was again given great importance in affecting the conditon. Burger[4] and Weiland[27] noted pyloric and duodenal ulcers in their cases.

Podkaminsky[18] regards interposition as an expression of abnormal intra-abdominal pressure. He also lists as causes, adhesions in the region of the colon resulting from parapyloric ulcers, changes in the size of the liver, weakness of the hepatic ligaments, hepatoptosis, and megacolon. These conditions may be present in various combinations.

Uspensky[24] adheres to the hypothesis that inflammatory processes in the region of the colon lead to the later formation of adhesions which fix the colon in abnormal sites. He considers as important factors pleuro-diaphragmatic peritoneal adhesions, Hirschprung's disease, changes in form and size of the liver. He attributes temporary interposition to disturbances of the balance between the specific gravity of the liver and that of the colon, as in ascites and pneumoperitoneum.

Although the migration of the colon to lodge in a subphrenic position is of great significance, the factors underlying the formation of the aperture between the diaphragm and the liver are obviously of equal importance.

Investigators vary in their opinions on the subject of loss of hepatic contact with the diaphragm. Some give the anomalies of length and strength of the hepatic ligaments as the cause. Just[14] contends that the ligaments play a very small part in sustaining the liver in apposition with the diaphragm. He believes that the pressure within the abdomen maintains the filled bowel in a lowered position, consequently exerting an upward influence on the liver, whereas, the airfilled bowel will rise and tend to displace the liver downward.

It is common knowledge that the liver edge descends during celotomy when the normal intra-abdominal pressure is disturbed. Free gas in the abdominal cavity from artificial pneumoperitoneum or perforation of ulcers (such a case reported by Weiland[27]) would conceivably destroy the normal intra-abdominal pressure.

Wessler and Jaches[28] in 1923 pointed out that the downward displacement of the liver in eventration of the right diaphragm and in hepatoptosis was one of the most important features in the occurrence of interposition of the colon.

Some observers are prone to point to the diminution of the size of the liver as the basic cause of its optosis. This condition was present in the cases reported by Assmann[1] and Dehn[9] and Just[14]. The decrease in the size of the liver plus the loss of normal plasticity has been suggested as the pertinent combination of factors in the interposition of the colon. Zucchi[30] points out that as long as the liver is of a plas-

tic consistency, it does not lose its contact with the anterior abdominal wall. He believes it is only when the loss of plasticity of the liver is accompanied by an abnormally long right colon that interposition can occur.

Congenital variation or absence of some of the hepatic ligaments has been noted. General visceroptosis has been alluded to with its resultant excessive traction on the hepatic ligaments, particularly the gastrohepatic.

Slavin's[20] cases of interposition after induced phrenic paralysis indicate that varying degrees of weakness or malfunction of the diaphragm may be important etiological factors in these cases. He suggests further that right-sided artificial pneumothorax tends to weaken the contact between liver and diaphragm and facilitates their separation.

Clinically a few interesting and salient features are manifested by the patients suffering from interposition of the colon. They are frequently of the asthenic, visceroptotic type and present the characteristic anxious facies. The abdominal pain may be general or localized and accompanied by nausea and ofttimes by vomiting. The pain may be referred to the right shoulder, but more often it passes about the abdomen and is accentuated by deep inspiration. Constipation and meteorism are constant symptoms. The epigastrium may be distended. The normal anterior costal liver dullness is lost, and there may be a palpable mass in the right lower quadrant. The diagnoses is supported roentgenologically.

These cases are frequently complicated. Gall bladder disease, peptic ulcer, obstructive lesions of the colon may be added to the interposition of the colon, often making the differential diagnosis extremely difficult until it occurs to the observer that the visceroptotic type must be suspected of this condition. The x-ray clinches the diagnosis.

In the cases of permanent incarceration of the colon in the subphrenic region, surgery offers much if symptoms are severe. Conservative measures may suffice when the symptoms are mild.

Hepatopexy, according to the technique of Marchant and Langenbuch, fixes the liver to the abdominal wall with sutures either through and through, or partially through the upper liver surface only. Ferrari, Richelot advise the placing of a drain between the liver and diaphragm to enhance formation of adhesions. Giordana shortens the falciform ligament and places small crystals of phenol on the upper surface of the liver. Another method of producing adhesions is that of Bobroff who scarifies the upper hepatic surface. The technique employed by Gianturco was that of a combination of interrupted mattress sutures through the marginal liver substance, thereby fixing it to the costal arch, and the iodinization of the upper surface of the liver.

In the case presented we have a definitely splanchnoptotic individual whose transverse colon was found to be elongated and distended. The patient had for many years been troubled with "gas" and bloating—a common complaint of these people. The liver had diminished in size and had lost its contact with the diaphragm. We were unable to determine any loss of plasticity. There was no congenital absence of ligaments. The falciform ligament was relaxed, thereby permitting the shortening as described above.

The long meteoric colon rising as it logically should, has sought the highest vantage point of the abdominal cavity, namely, the diaphragmatic dome. The trauma attendant with the position of the distended bowel may be ample justification for the presence of adhesions. It is then not difficult to account for the exaggerated symptoms accompanying such variations from the normal anatomical relationships.

Although the general opinion is adverse to surgery in conditions akin to this, and we believe the stand a righteous one, such marked findings in this case prompted us to attempt surgical treatment. The result, fortunately, has been entirely gratifying.

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DISCUSSION

Dr. Edward M. Miller, Chicago: Having been asked to discuss the rôle of surgery in visceroptosis, I am very naturally surprised to find Dr. Rogers presenting a paper on "Interposition of the Colon Between the Liver and Diaphragm." The case which he presents has been very interesting and most instructive because I, like most of you, no doubt, have had no similar experience. The chief indication for surgical interference in cases of visceroptosis arises when there is produced an obstruction of the third part of the duodenum by the superior mesenteric vessels which cross its anterior surface. In persons who lose weight rapidly and therefore lose the supporting effect of the normal intra-abdominal fat, this type of obstruction is apt to be very severe and will give rise to symptoms demanding surgical relief by duodenojejunostomy. Where the evidence of obstruction is mild, medical measures aimed to build up the normal weight will be effective. Several lantern slides were here shown illustrating the typical x-ray findings before and after operation.)

Dr. J. C. Thomas Rogers, Urbana (closing): It was impressive to find in looking over the literature that most of the reports were recorded by foreign observers. It is interesting to note that this patient was foreign born, raised in Austria, and later in life came to this country. In response to Dr. Miller's discussion of duodenal obstruction I wish to add that there are reported cases of duodenal obstruction complicating or possibly caused by hepato-diaphragmatic interposition of the colon. I couldn't be certain as to the presence of duodenal obstruction in this case. The subjective symptoms were relieved upon restoring the colon to a more anatomically normal position. If there were duodenal obstruction, it evidently was relieved coincidentally.

PAROXYSMAL DYSPNEA: DIAGNOSIS AND TREATMENT

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By the term "paroxysmal dyspnea" we are limiting our discussion today to the relatively few conditions which are characterized by *attacks* of difficult breathing; wheezing and orthopnea are usually associated. And, in most cases, there is more or less complete freedom from dyspnea between attacks.

The paroxysmal nature of the dyspnea automatically causes us to exclude from consideration all causes of ordinary or non-paroxysmal dyspnea. We, therefore, are not concerning ourselves with such common causes of difficult breathing as ordinary heart disease in the various stages of decompensation; nor are we dealing with anemias, pulmonary tuberculosis, emphysema, lung tumors and other conditions associated with chronic shortness of breath. It is true that a patient with mitral disease may decompensate with associated dyspnea; but in such an event the shortness of breath is usually somewhat constant until compensation is re-established or death intervenes.

Paroxysmal dyspnea is of relatively common occurrence yet its differential diagnosis and treatment seem not to be well understood. In a recent examination for interneships one of the questions was on this subject; a few of the candidates answered intelligently; most failed to grasp the significance of the question and wrote on dyspnea in general, instead of appreciating the paroxysmal nature of the trouble.

What conditions can cause paroxysmal dyspnea? While there are many in which spells

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of shortness of breath can occur there are really only three which are important. These are, in order of frequency, bronchial asthma, cardiac asthma and that type of sudden dyspnea which may occur in chronic nephritis; the term "renal asthma" has often been used here.

The differentiation between these three is very important because of the wide variation both in treatment and in prognosis, especially as concerns cardiac asthma and bronchial asthma.

Cardiac Asthma. Despite the fact that cardiac disease in general is common, as we all know, cardiac asthma is relatively infrequent. Paul White,[1] in his recent book on "Heart Disease," states as follows:

"The term 'cardiac asthma' expresses the exact condition better than any other, e. g., 'paroxysmal dyspnea,' for it is a paroxysm of asthmatic and not of ordinary dyspnea; and it is undoubtedly primarily due to the *cardiac condition* and not to some extraneous influence, as is the case in bronchial asthma. It belongs to the chapter of congestive heart failure and yet it is not an ordinary symptom of such failure. It occurs especially in middle or old age with serious heart disease, usually involving the *left ventricle.* The attacks may be mild, short and hardly noticeable; they may be terribly agonizing, ending in pulmonary edema and death; or they may be of any degree between these two extremes. Infrequently cardiac asthma may continue for days or weeks in mild form."

The paroxysms in cardiac asthma are in many respects very similar to those of bronchial asthma. Dyspnea, wheezing and orthopnea are present in both and cough is frequent. Cardiac asthma usually occurs at night; bronchial asthma frequently starts at night but it begins almost as often in the daytime. In every other way, however, the two diseases cease to resemble one another.

Pratt[2] gives a very good discussion of the actual spasms in cardiac asthma. He describes a mild attack as follows:

"The patient, usually a man and more than sixty years of age, goes to bed feeling perfectly well. He may have had slight breathlessness or substernal pain on exertion, for some time, possibly six months or more, but as a rule of slight degree so that he has paid no attention to his symptoms (in fact, in one-third of the cases, there were no symptoms referable to the heart prior to the initial attack of cardiac asthma). He sleeps soundly until he is suddenly awakened by a sense of suffocation and oppression, which causes him to spring upright in bed and if it persists he sits on the side of the bed, or gets up and walks to an open window. The breathing is labored and the feeling that he cannot get air into his chest continues. In a few minutes the attack may cease or he begins to cough. The breathing is often wheezy. The cough is at first dry, but after a short time a little thick mucus is raised, which is occasionally tinged with blood. Cyanosis has been noted only in the severe attacks. There may be an ashy pallor instead of cyanosis. The breathing at length becomes easier and soon afterward the breathlessness entirely disappears. He is able to return to bed and sleeps fairly well with the head low the remainder of the night. The average duration of an initial mild attack is thirty minutes. Including all twenty-six cases, mild as well as very severe, the average duration was one hour."

Rockfelt[3] of London, gives an excellent description of a very severe case of cardiac asthma:

The patient was a woman, 52, with aortic insufficiency for at least three years, with enlarged heart, systolic blood pressure of 160 mm., visible pulsation in the carotid arteries and marked water-hammer pulse; some edema of the feet but no edema in the lungs. During the past year she had nine attack of paroxysmal dyspnea, all similar. The interval between the first two was about three months, but they gradually became more frequent. With one exception all occurred between 10 p. m. and midnight with sudden onset and without any previous warning. On arrival, the patient is trying to sit up in bed; she is anxious and terrified and appears to be aware of the danger of the attacks. The breathing is rapid and difficult. The face is pale and covered with a cold sweat. The lips and nose are livid. The fingers are cold and clammy. The pulse is feeble, small and rapid. The temperature is subnormal. There is a profuse pink frothy expectoration and foaming at the mouth. After a short time consciousness is lost. Over the entire chest are heard numerous coarse bubbling rales. The attacks last about two hours. On one occasion the patient had two attacks in one night between which she recovered consciousness and lost her distress. On the day following an attack she feels quite well and has often been found out of bed.

Cardiac asthma is a very serious condition. It is frequently attended by pulmonary edema as shown by rales at the base of the lungs and by hemoptysis. It appears to be dependent on weakness or acute failure of the left ventricle although the exact mechanism of its production is not known.

How serious the *prognosis* is may be judged from the summary by Palmer and White[4]; these authors found 250 cases of cardiac asthma in a group of 3,100 private and hospital patients with organic heart disease, equal to 8% of the total number of heart cases. Of this 250 who had attacks of cardiac asthma as shown by paroxysmal dyspnea 180 were males, 70 females; all but 14 were over forty years old. The grave prognosis was shown by the fact that 170 of the 250 are known to have died with an average dura-

tion of life of only 1.4 years after the first attack of cardiac asthma. The largest number of cases, 187, were found in the group of patients with coronary disease, hypertension, or both (cardiac asthma was present in 10.7% of this combined group); but the highest relative incidence was in syphilitic heart disease (21.0%) and in chronic nephritis (19.0%). The frequency, duration and severity of the attacks altered the prognosis appreciably only when the attacks were very severe. The coincidence of poor heart sounds, gallop rhythm and pulsus alternans indicated, as a rule, a very short life. Aortic regurgitation, usually syphilitic, was the only common valve defect and occurred in sixty-three of the 250 patients studied.

One very striking feature of cardiac asthma is the patient's fear of death; by contrast, those suffering from severe bronchial asthma are afraid they will not die.

The treatment of cardiac asthma is very important. To prevent the attacks it is necessary to insist on rest suitable to the individual patient and on digitalis in adequate amounts. Such care may prevent the spells or, at least, diminish their severity and frequency. For the attack itself morphine sulphate, subcutaneously, in 1/6 to ¼ grain doses is the best possible treatment. It should be repeated in 15 to 20 minutes, if necessary. An upright position helps a good deal. Some men favor venesection with removal of 250 to 300cc of blood. A drink of whiskey, or brandy, may be of service. Digitalis is not of much use for the attack. Epinephrin (adrenalin) is also almost useless.

Bronchial Asthma. When we turn to the consideration of the more frequent bronchial asthma we enter a much more cheerful field, especially as regards prognosis. It may and does occur at any age. I have one little patient who was born in July and who had hay fever and asthma when two months old. In the majority of patients the asthma begins during childhood or in young adults and there usually is a history of repeated attacks. Some of these occur only in summer time, in individuals hypersensitive to hay fever pollens, such as those from trees, grasses and weeds. Others may occur at any time of the year. The attacks, as a rule, are widely separated at first with long intervals of freedom between the spells. Later on, however, the spells are apt to come on more frequently and, finally, in many cases, the asthma becomes more or less constant and there is no complete freedom from trouble. Wheezing and dyspnea are almost constant. In other words, we are now dealing with chronic, intractable asthma, the most severe type of bronchial asthma. Such a patient may live many years but the prognosis for cure or relief is not especially good.

When we examine a patient with bronchial asthma we usually find dyspnea, orthopnea and cough; wheezing is practically always present and expiration is prolonged. The heart is usually small, the pulse may be slow or rapid, the blood pressure is usually low. The patient feels warm and perspiration is frequent. Fear of death is rare. In long standing cases emphysema often complicates the picture and leads to cyanosis and a barrel chest.

As aids to the diagnosis of bronchial asthma the following findings are helpful: In many of the patients it will be found that they are suffering from or have had other allergic conditions, such as hay fever, urticaria or migraine. Eczema occurs frequently in childhood in persons who develop asthma in later life. In addition, in about 60% of the cases, there is a family history of some one or more allergic conditions, not necessarily bronchial asthma.

Skin tests, thoroughly and properly carried out, are of great aid in ferreting out the cause of the attacks. To be valuable they must fit in with the clinical picture. Lack of time permits us only to insist that the skin tests be carried out early and completely. The patients should not be permitted to have repeated attacks with resultant emphysema.

As further aids to the making of the diagnosis of bronchial asthma, in addition to the skin tests, there will be found, in most cases, an eosinophilia of over 4% in the blood; the sputum will usually show many eosinophiles as well as Curschmann spirals and Charcot-Leyden crystals.

Another determining factor in bronchial asthma is that most attacks can be quickly overcome by the subcutaneous injection of 0.25cc to 1.0cc of epinephrin (adrenalin). For such spells this drug is far superior to any other. It may be repeated as often as necessary and is not habit-forming. Ephedrin is not of much

use in severe spasms. It does help mild paroxysms and aids in prevention.

To prevent attacks of bronchial asthma the best treatment is the specific one of finding and eliminating the cause of the paroxysms; a searching history and the correct use of skin tests are the two main methods in this connection. If the cause cannot be completely eliminated and if it is important it should be combated by the process of desensitization. This is usually done by injecting small doses of an extract of the offending protein, then increasing the strength of the extract at regular intervals.

The above-mentioned treatment, from the allergic standpoint, has led to many very excellent results. In fact, so many individuals have been completely relieved of their asthma for many years that they may properly be called "cured." Unfortunately, there are many victims who are only temporarily relieved and a few who are not helped at all. On the whole, however, the majority of patients receive distinct benefit from proper allergic treatment. Non-specific measures help in some cases where specific ones have failed.

Time will not permit further discussion of the treatment of bronchial asthma. One very important point needs emphasis. Morphine, which is life-saving in cardiac asthma, should not be used in bronchial asthma. Epinephrin acts much more efficiently in bronchial asthma; morphine does not work as well, leads to a habit and, in many patients, it causes vomiting, itching of the skin and many other untoward results. If given with adrenalin or after adrenalin it may lead to the death of the patient.

The literature on bronchial asthma is very voluminous and it is suggested that reference be made to one of the several text-books on the subject, such as Asthma and Hay Fever in Theory and Practice[5,6,7]. In addition, the following articles may be consulted,[8,15].

Paroxysmal Dyspnea of Chronic Nephritis (Renal Asthma). As the attacks of paroxysmal dyspnea which occur in chronic nephritis are closely related to those of cardiac asthma we shall dismiss them briefly. The condition is not uncommon and constituted 19% of the 250 cases of Palmer and White.[2] There is a history of long-standing nephritis with its attendant symptoms and then the paroxysms occur and may recur a few times before death ensues. The prognosis is very poor. Physical findings are somewhat similar to those of cardiac asthma. In addition, uremia may supervene and there may be a uremic frost, Cheynes-Stokes respiration and a recent acute fibrinous pericarditis. The dyspnea is usually of a stertorous character and the breath foul. The urine usually shows albumin and casts and the blood an increased retention of nitrogenous constituents. The patient is in middle or old age. The treatment of rest, depletion and diet, with morphine perhaps, is usually of little avail.

Other Causes of Paroxysmal Dyspnea. It might be well here to briefly point out that certain other conditions may be confusing. Hysteria must be thought of but there is no real wheezing nor dyspnea and it should be distinguished quite easily.

Certain causes of inspiratory dyspnea must be considered at times; these are due to obstruction of the upper air passages. Laryngeal diphtheria and edema of the glottis, as from streptococcus sore throat, are not uncommon. Laryngeal tumors and foreign bodies in the larynx, trachea or primary bronchus may confuse. Sometimes a pharyngeal abscess or an aneurysm may cause dyspnea by pressure. In all of these, however, the dyspnea is inspiratory for the most part and is more or less constant. In laryngismus stridulus (ordinary croup) the suddenness of the attack may confuse but the age of the patient and the character of the breathing offer no difficulty. Wheezing is not present as it is in bronchial asthma and there are no other findings characteristic of allergy.

SUMMARY

1. Paroxysmal dyspnea is frequent and important as regards the diagnosis of its cause, treatment and prognosis. Cardiac asthma, bronchial asthma and chronic nephritis are the chief causes.

2. The treatment of cardiac asthma consists of rest and morphine; digitalis is only useful between attacks.

3. For the treatment of attacks of bronchial asthma epinephrin is the best drug; morphine should not be used. Between paroxysms complete skin tests should be done; causes of attacks should be removed wherever possible; desensitization should be carried out, where indicated.

4. The prognosis in cardiac asthma and in the dyspnea of nephritis is poor. Duration of life is short. The prognosis in bronchial asthma is usually excellent but it depends a good deal on whether proper treatment is instituted at an early period of life.

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DISCUSSION

Dr. George Parker, Peoria: The differential diagnosis between cardiac and bronchial asthma is difficult sometimes when one sees the patient in an attack for the first time and has had no opportunity for study of the case. The urgency for relief is so great that it must be met at once. The admirable description of the essayist should help us in differentiating the various types of paroxysmal dyspnea, and should also aid us in the administration of the proper remedy. After we have seen the patient in numerous attacks and have had an opportunity for study, the diagnosis is usually not difficult.

Although the exact mechanism of the attack in which cardiac asthma occurs is not clear, insufficiency of the left ventricle is the basis. Therefore, it is well to keep in mind the various conditions which bring about this weakness. These are hypertension, coronary disease, luetic heart disease and chronic nephritis, either singly or in combination.

The old terms renal asthma and uremic asthma are misleading and practically obsolete. Almost all varieties of renal disease are associated with hypertension and cardiac hypertrophy. True uremic dyspnea is an acidotic dyspnea and is accompanied by a lowering of the carbon dioxide tension of the blood.

It should not be forgotten in the discussion of differentiation of paroxysmal dyspnea that cardiac and bronchial asthma may coexist and here the therapeautic problem is a combined one.

In the treatment of severe cardiac asthma I have found venesection a valuable thing, with the use of morphine. Digitalis, rest and intravenous glucose 50 to 100 c.c. of a 50 per cent. solution daily may prolong life and add a measure of comfort to these patients.

It has been a pleasure to hear and discuss this excellent paper by Dr. Unger.

Dr. E. M. Stevenson, Bloomington: Dr. Unger's paper, "Paraxysmal Dyspnea," may be considered a plea to the medical profession for a more complete understanding of this notoriously distressing problem.

The success in management of the individual attack depends entirely upon our ability to differentiate between the causes of paroxysmal dyspnea which Dr. Unger has mentioned. Our ability to differentiate the causes of paroxysmal dyspnea also enriches our capacity to provide proper prognosis. Not only the patient but the members of the family who, in most instances are nearly as distressed at the sight of a loved one gasping for breath as is the patient, are entitled to a statement relative to the possible outcome. As Dr. Unger has pointed out the prognosis in the bronchial type is much better than is dyspnea of either cardiac or uremic origin. We not only protect the patient and the family in offering a statement as to the outcome in the individual attack, but we also enable the patient after the attack to protect himself, to a certain degree, against future episodes.

The essayist alludes several times to the use of morphine as a therapeutic agent in the control of the attack. In my opinion, it is a very worth while warning. In the cardiac patient it is a drug of choice, but in the bronchial patient, who is allergic and who many times is sensitive to opium, it is very apt to produce nauseau and vomiting, thereby aggravating the attack. It is possible to produce fatal termination by its indiscriminate use.

In the light of Dr. Unger's wide experience I should like to ask his opinion of the border line case, that is, the individual who presents both the bronchial and cardiac type of paroxysmal dyspnea. I should also like to ask the essayist what his experience has been in connection with the bronchial type associated with hypertensive heart disease.

Dr. A. B. Magnus, Chicago: In neuropsychiatric service one occasionally meets with cardiospasm, cases who have certain complications either secondary or independent of neurological or psychiatric findings. I am interested in how you treat them, because they are somewhat foreign to my work. In regard to bronchial

asthma, I thought much work had been done with fever therapy. I have been employing prolonged sleep therapy with bariturates in cardiac spasm with success.

One often meets with the type of asthma called "functional" asthma. The speaker has only slightly referred to this. I would, therefore, ask Dr. Unger what procedure he follows in his therapy with the functional type of paroxysmal asthma?

Dr. R. B. Hemphill, Oak Park: I was very much interested in the statement Dr. Unger made about the high percentage of interns failing on the question about asthma. I think it behooves each of us who has anything to do with teaching the interns and undegraduates, in view of this unfortunate situation, to discuss this important question. Perhaps the first problem these young men will face when they get out will be a case of this condition in the middle of the night when he must make a decision and make it rapidly.

Dr. Leon Unger, Chicago (closing): I have not used hydrochloric acid intravenously in the treatment of bronchial asthma. I have had two patients who had this form of treatment elsewhere and had such poor results and such an aggravation of their symptoms as to discourage me. I have used it by mouth with no results.

Regarding Dr. Parker's statement about the obsolete use of the term "renal asthma" because there is no proof that renal asthma causes bronchospasm, I do not believe bronchospasm causes bronchial asthma. There are a few men who do believe that bronchospasm is caused by a reflex arc, but this has never been proved. Our theory, and I think it has been substantiated, is that bronchial asthma is due to plugging up of the bronchial tubes by sputum and to actual hypertrophy of the walls of the bronchi. It is true that bronchial asthma and cardiac asthma may coexist and this makes a difficult problem, but I am convinced that bronchial asthma patients live as long as any one else in spite of insurance statistics. Those statistics are published under the term of asthma alone and may include some with cardiac asthma. When I say bronchial asthma I mean the allergic form, and when I say cardiac asthma I mean that form due to cardiac disease.

I did some work a few years ago on the heart in bronchial asthma with electrocardiograms in 74 patients and we found that these patients had just as good electrocardiograms as the normal person with the possible exception that many showed a tendency toward a right ventricular preponderance.

In regard to the relationship of bronchial asthma and hypertension I think it is only incidental.

As to functional asthma, I do not believe such a thing exists. I believe there is a hysterical form. There are patients who breathe deeply who think they have asthma, but I tell them they do not have it. As to fever therapy, I personally have given it up. I tried it with eight patients and have abandoned the use of it entirely.

ORTHOPTIC TREATMENT OF STRABISMUS

A Further Report from the Records of the Illinois Eye and Ear Infirmary

J. L. BRESSLER, M.D.

CHICAGO

Many of you who are here today may have heard my preliminary report on the orthoptic work of the Illinois Eye and Ear Infirmary at Springfield last year, or you may have read it in the ILLINOIS MEDICAL JOURNAL. My report today, after twenty months of clinical observation, embraces all the work done in this orthoptic clinic up to the present.

The organization of this clinic followed a very glowing report of the work accomplished at the orthoptic clinic of Northwestern University, the report having been presented by Dr. Guibor at the annual meeting of the American Medical Society in Milwaukee, June, 1933. Many ophthalmologists immediately became very enthusiastic, and some, over-enthusiastic. Although our orthoptic clinic had, as its immediate object, the treatment of strabismus, with the elimination of the deviating angle and the development of fusion, our ultimate object was the study and investigation of orthoptic treatment along the lines and principles suggested by Northwestern University. At the time that Dr. Guibor made his first report, he invited other orthoptic clinics to adopt similar methods in order to check his work, and my paper today includes a critical analysis of my results, as compared with those of Northwestern University.

I will not go into the history of orthoptic treatment. It is sufficient to say that this is not a new therapeutic measure in the history of strabismus. Non-operative measures were attempted as early as 1870. Among the earliest investigators, Javal and Remy stand foremost. Javal on the one hand, using a stereoscope only, condemned the treatment after several years of investigation. Remy, on the other hand, always remained a staunch believer in orthoptic treatment. From this early beginning up to the present time, there have been several cycles or waves of enthusiasm and condemnation of the treatment. The present wave of enthusiasm for orthoptic training in the treatment of strabismus

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may easily go the same path of oblivion as the others, unless guarded by conservatism and truth. Over-enthusiasm and charlatanism must be discouraged and guarded against.

In England and in this country, numerous clinics have been established for the study and investigation of this form of treatment. Some splendid work is being accomplished in these countries, using the English method. Besides these countries, however, no others are making any attempt at doing anything with orthoptics, with the exception of France which has one clinic in Paris where, under Cantonnet, some good work is being accomplished.

A short description of a number of instruments and appliances most useful in doing this work should, I think, be instructive.

The stereoscope and its many modifications were the earliest instruments used in the rebuilding of fusion, and the elimination of the deviating angle. The results, using this type of instrument only, always proved disappointing, and because of this the method fell into disfavor at various periods. Cantonnet in his book on strabismus says of Javal, "It must be remembered that he used almost entirely the stereoscope, an instrument which does not lend itself easily to the early stages in the orthoptic treatment of strabismus." It is sometimes very difficult to eliminate suppression with this instrument, and it cannot be adjusted to the patient's angle of deviation, an important step in the early stages of treatment.

Worth's amblyoscope, although a very crude instrument today, found favor and was useful for many years. It has now been almost superseded by some very excellent modifications known as the synoptophore, snyoptiscope, and orthoptoscope. These, as well as Worth's amblyoscope, are based on the mirror-reflecting principle. They have the advantage over all other instruments of being capable of adjustment to the patient's deviation. With these instruments every stage of fusion may be developed. Eyes with false fixation and false projection, and also those with the so-called false macula, may be stimulated so as to develop simultaneous macular perception with corresponding retinal areas. In my opinion, this type of instrument lends itself to more uses in orthoptic training than several others I can mention. No clinic and no office, where orthoptic work is conscientiously and honestly being attempted, should be without one or more of these instruments.

The Wottring normalizer or stabilizer, consisting of a moving disc and red light, is very useful in developing diplopia and overcoming suppression, with the aid of prisms producing diplopia in the vertical fields of vision.

Among the other instruments and appliances found useful in this form of treatment are Lloyd's campimeter, Wottring rotoscope, kinetic stereoscope, stereophorometer, Keystone telebinocular, cheiroscope, diploscope, myologic unit, prisms, slides, and cards of Wells, Sattler, Dvorine, Keystone, and Guibor. Various drawing sets designed to stimulate vision in amblyopia are also frequently used. Atropine and various occluding devices must not be overlooked. One must adopt many instruments, appliances and methods for the various problems always encountered in the efficient handling of strabismus, and in the work of re-educating squinters.

A brief resume of the accepted theories of the causes of strabismus is as follows:

1. Nervous Theory. This takes into consideration the possibilities of the presence, in a given case, of a hypertonus or hypotonus of the convergence center; but, in addition, this theory also takes into consideration the influence of errors of refraction.

2. Optical Theory. This theory is very complex; it is different for convergent and divergent squint.

Convergent Theory. In 1860, Donders advanced the theory that a hyperope, having to accommodate too much, also converges too much, and throws on one eye, the weaker if vision is unequal, the excess of convergence, in order that the eye with the better vision may continue to fix. The objection to this theory is that all hyperopes do not become convergent strabismics; there are hyperopes that are divergent. Myops and even emmetropes may develop convergent strabismus.

Divergent Theory. Donders believed myopia to be the fundamental cause of this type of squint. A person with myopia, not having to accommodate, has little tendency to converge. If he does converge at all, it is at the cost of a dissociation of convergence and accommodation which produces a fatigue of convergence, and ultimately a divergence. This theory takes into consideration a weakening of the converging muscles. The chief objection to this theory is that many myopes have good binocular vision.

3. Muscle Theory. This attempts to explain all cases by the congenital or acquired weakness of a muscle. In some cases this may apply. The objection to this theory is, however, that it cannot apply to alternating strabismus; and in recent cases no muscular lesion can be demonstrated.

4. Psychical Theory. Some authors believe squint to be the result of a mental clumsiness, similar to that

which is found in stammerers; that is, a lack of coordination of visual sensations. Recently Fink attempted to prove such an association by tracing the occurrence of stammering and right and left-handedness in sixty cases of squint. In my opinion, he failed to prove any definite connection.

5. From Binocular Vision to Strabismus. Cantonnet advances the theory that certain factors interfering with an individual's binocular vision tend to produce neutralization or suppression, followed by a deviation. Claude Worth was among the first ophthalmologists, many years ago, to recognize the presence of defective fusion in all cases of squint. He emphasized this fact in his book.

Orthoptic exercises aim to eliminate the angle of deviation and re-educate the fusion sense. If we succeed in getting a parallelism of the eyes or a reduction of the angle, but fail to develop fusion, there is always a possibility of the angle of deviation recurring.

An important question often asked, is "What is fusion?" The simplest answer to this is that fusion is the ability we have of seeing the same object with both eyes as one object. The different grades of fusion recognized are as follows: first, simultaneous macular perception; second, simple fusion; third, stereoscopic vision; and fourth, fusional amplitude. The following are some of the advantages of binocular vision: first, it acts as a regulator of the convergence function; second, it permits a better judgment of distances; third, it increases the brightness of objects seen; and fourth, it permits a perception of relief or stereoscopic vision. The eye which is used to see is called the fixing eye; the other is the squinting or deviating eye.

Among the numerous tests for binocular vision, and the various instruments and appliances used in its determination, are the following listed below:

1. Cantonnet test.
2. Remy separator.
3. Worth's four dot test.
4. Berens' spectacle test.
5. Red glass and Maddox rod.
6. Stereoscope.
7. Amblyoscope, synoptophore, and other modifications.
8. Diploscope.
9. Herring drop test.
10. Javal bar reading test.

Certain conditions usually present in any given case of strabismus are these: first, a deviation of the axes, either monocular or alternating; second, a defect of the fusion faculty; third, a suppression of the vision of the non-fixing eye, either complete or partial; fourth, an acquired amblyopia, occurring frequently, especially in unilateral squint; fifth, in rare instances, a congenital amblyopia; and sixth, a refractive error.

There are certain definite factors to be considered in the selection of a case for treatment. There are many contraindications. Certainly all cases are not suitable for re-education. In our clinic at the Illinois Eye and Ear Infirmary, following the lines advocated in the first report of the work at Northwestern University, no selection of cases was attempted. This, in my opinion, after twenty months of experience with the method, is a wrong procedure. Some of the factors to be considered are listed below:

1. Age. Some authors state that the younger the patient, the better the result. Chief among these advocates are Worth and Peters. I, too, feel that some treatment should be attempted early in cases of strabismus. Refraction, and measures toward eliminating any amblyopia present, should be instituted as early as possible; but in regard to fusion training, the age and cooperation of the patient and the methods employed should be taken into consideration. Using the English method, with the synoptophore, children may be treated at an earlier age than with any other device. Using the stereoscope, normalizer, diploscope, and many other instruments, good cooperation and the exercise of the will power is necessary. We cannot expect children much under seven or eight years to respond. However, Worth and Peters believe treatment should be instituted before the age of six or seven, the period in which fusion is developing. Maddox and Cantonnet, on the other hand, believe that frequently adolescents and young adults also develop fusion. In my own experience, I have had several cases in which fusion has been developed in patients ranging in age from nineteen to twenty-six, no fusion having been present before.

2. Degree of Deviation. If the angle of deviation is very large, a cure will be more difficult than in cases of a lesser deviation. The most favorable cases are those having an angle of less than 25 degrees. Certainly no case having an angle of over 35 degrees should have any attempts made for a correction with treatment only.

3. Visual Acuity. Low visual acuity in the presence of pathological lesions offers no possibility for improvement. These lesions may be in the cornea, lens, or retina. An accurate refraction under a cycloplegic must first be done. Deviated eyes with vision as low as 20/200 or less are not capable of re-education, but exercises and occlusion for the amblyopia often improve the acuity so that the prognosis of the case may change. It is generally considered that the acuity of the deviated eye must be at least 20/65, or in rare cases 20/100, in order to expect any success. Those patients having a so-called false macula with false fixation and false

projection are not good material for re-education unless this defect is first corrected.

4. Excursions of the Eyes. Cicatricial retraction of the ocular muscles in squint is rare before adult life. This must be investigated, however, by measuring the inward and outward rotation of each eye separately. In the presence of a tendonous retraction re-education is impossible. Paralysis and paresis must both be ruled out.

5. Degree of Suppression (Neutralization). If it is possible to elicit diplopia readily the case should prove very favorable. If the suppression is very tenacious and difficult to overcome, the results will be more difficult to obtain.

From the foregoing it can be easily seen that all cases of squint are not favorable material for treatment, but on the contrary should be carefully selected. Two other factors influencing the results, but not mentioned above, are the attendance of the patient and the psychical conditions present. Regular attendance must be insisted upon, treatments being given daily, or at least three times weekly. The psychical conditions must be favorable, the patients showing an average intelligence and exercising sufficient will to master the problems. Patients of low mentality and those who do not cooperate are not favorable cases.

In the following I will now give you a brief outline of our Routine Management of Strabismus:

1. History. This should be taken on the first visit and should be very complete, including the following:
   - A. Complaints. Headache, diplopia, eye weakness, etc., should be noted.
   - B. Family History. The presence of squint in any member of the various branches of the family should be inquired into.
   - C. Patient's Personal History. The birth—normal, abnormal, or premature—the mental development, the school record, and the right or left-handed tendencies should be ascertained.
   - D. Patient's Medical History. The previous illnesses or injuries and any speech or hearing defects must be noted.
   - E. History of Squint. The mode of onset—occasional, periodic, or constant—the age of onset, the parent's theory of the cause, and the progress of the case, if any, should all be recorded.
   - F. Previous Treatment. It should be asked if the patient has had glasses and if so, how long they have been worn. It should also be noted if drops were used in the examination. If any occlusion or atropine was ever prescribed for an eye, any treatments or exercises of any kind given, or any operation performed, the facts should be duly recorded, the dates and types of operation being noted also.
2. Examination. This is accomplished in two steps.
   - A. Objective.
     1. Diagnosis (Character of squint). This may be either convergent or divergent, unilateral or alternating, concomitant or paralytic.
     2. Angle of Deviation and Angle of Kappa (Gamma). This is measured with and without glasses for distance and near, the muscle light being at 20 feet for distance and at 33 centimeters for near. The angles are taken with a special strabismometer developed in our clinic, and built for us by the American Optical Company. Other methods for measuring the deviation are as follows:
        - a. Duane's screen and parallex with prisms.
        - b. Maddox rod and prisms.
        - c. Priestly-Smith tape.
        - d. Deviometer of Worth.
        - e. Ordinary perimeter.
        - f. Stereo-campimeter, measuring displacement of blind spot.
        - g. After image method.
        - h. Double image method.
     3. Power of Central Fixation. The kind of fixation—good, fair, or absent—is noted for each eye separately and eccentric or false fixation recorded.
     4. Motility. The excursions of each eye outwards and inwards are measured separately. These measurements are also taken with my special strabismometer.
     5. Near Point of Convergence.
   - B. Subjective.
     1. Vision. This is taken with and without glasses.
     2. Fusion Ability. This is done to determine the presence or absence of fusion (the degree if present), the presence or absence of simultaneous macular perception, the presence or absence of suppression and degree. Some of the tests are as follows:
        - a. Remy Separator. This is used to determine simultaneous macular perception.
        - b. Berens' spectacle Test. This is used to determine single binocular vision.
        - c. Worth's four dot Test. This is used to determine binocular vision or diplopia.
        - d. Amblyoscope. This is used for all grades.
        - e. Stereoscope. This is also used for all grades.
        - f. Synoptophore. This too is for all grades.
3. Treatment. This is divided into active and non-active.
   - A. Non-active.
     1. Refraction. This is done under a cycloplegic immediately after the examination has been completed, if the patient has never worn glasses before. If glasses have been recently fitted by a competent ophthalmologist with a good result, no new refraction is done until indicated.

2. Prisms. These are used in lenses by decentration or slip-overs.
3. Ambloyopia. If this is present, it is treated with atropine in the fixing eye, or occlusion of the fixing eye, either complete or partial, or with exercises, drawing, lights, et cetera.

B. Active.

1. Orthoptic Training. This is preceded by the proper measures for correcting amblyopia, if the latter is present.
2. Surgery. This phase of the treatment for strabismus is not being discussed in this paper, but I will say that where surgery does become necessary and is performed, those patients who have had orthoptic treatment before operation, and certainly those who have received postoperative orthoptics, always show a rapid development of fusion and are more certain to develop parallel eyes. Many patients have been sent to my clinic for treatment after operation, with varying amounts of either undercorrection or overcorrection, and with orthoptic treatment we have succeeded in developing fusion and eliminating the remaining angle.

Although, strictly speaking, orthoptic treatment means the development of single binocular vision and stereopsis, in actual practice we do more than this. Our objectives are to restore or preserve the vision in the squinting eye, to eliminate the suppression, to develop fusion, and to eliminate the deviation.

Visual acuity is restored or maintained by the measures adopted for the correction of the amblyopia present. Atropinization is not very popular in our clinic. If insisted upon, we frequently lose our patients. I feel that better results can be had with occlusion. In addition, our patients get treatment at the clinic on the Maddox cheiroscope and other drawing devices. The use of sight-saving books with large print for home reading will also prove very helpful, we believe.

We attempt to eliminate suppression with the Remy separator, Cantonnet's method of deneutralization in strong light, Wottring's normalizer and prisms, the amblyoscope or synoptophore, or the stereoscope and prisms. With these we produce a diplopia or, in other words, simultaneous macular perception.

The synoptophore is the instrument of preference for obtaining single binocular vision. In the absence of this, we may use the amblyoscope, normalizer, diploscope, or stereoscope.

Depth perception, ductions, and amplitude are developed with the same group of instruments, using prisms, slides, cards, or objectives prepared for these purposes. We recently introduced in our clinic a pin exercise which is especially productive of results in post-operative cases and also in the development of convergence

Office and clinic treatment should be given daily by a competent trained technician under one's own supervision. These should be private individual treatments, and not in groups. In our clinic we have several booths which we expect to utilize for individual treatments. Our experience with group treatments has been very unsatisfactory. If daily half-hour treatments are not possible, at least three a week should be insisted upon, these being augmented by home treatment if the patient and parents are intelligent enough to cooperate. Peters says that he does not feel that three sessions a week are sufficient to develop a well-balanced fusion. Certainly one a week can be expected to do even less.

Home treatments are usually very unsatisfactory. Cooperation is rare and instructions are seldom correctly followed. Home treatments consist of the use of the stereoscope, Remy separator, Cantonnet's deneutralization in a strong light, cards, prisms, drawing, light flashing, reading, etc. These treatments should be followed daily, or twice daily, for periods varying from fifteen to thirty minutes.

No patient is given actual orthoptic exercise until he has worn his glasses for at least six months. During that period we feel that any correction of the deviation due to the refractive error alone will have been accomplished. A certain number of squints will straighten out while wearing their correction, but will immediately resume their deviation upon removal of their glasses. In less than 1 per cent. of such cases have we found that fusion developed spontaneously.

Angles of deviation are measured about twice each month. Ductions are taken after the angle of deviation has been eliminated and fusion developed. Stereopsis is also measured at this same period, with an instrument developed by Dr. Martin Cohen of New York, and modified by Dr. Wells of Boston who has described it in his book. I further modified it, and in this form it is being used in our clinic. Other instruments used to measure stereopsis are the Howard and Jones apparatus and the three-needle apparatus described by Cantonnet.

My suggestions as to the management of the non-operative treatment of starbismus, offer a somewhat different technique than the one we have been using at our clinic up to now. The same principles are involved and the same problems are to be met, but our mode of procedure will now be entirely different. Whereas up to the present our clinic has followed the routine adopted by Northwestern clinic, with all steps of the treatment dependent upon the use of the stereoscope, our process now recognizes that certain definite problems are to be met and overcome in each step of the treatment, and that certain instruments are definitely more useful than others in these various steps. Although Dr. Guibor has frequently stressed the importance of the stereoscope and considers it of most value in orthoptic training, our experience forces us to differ from this opinion. Peter, Wilkenson, Wells. and others also felt that the stereoscope has only a limited use in orthoptics and that one should recognize its limitations.

Angles must be taken frequently and carefully, as angles carelessly measured often lead to misinformation. Squints considered cured must have a complete elimination of their deviating angle. At a recent meeting of the Chicago Ophthalmological Society, Dr. Guibor presented a paper pertaining to this subject, and was asked, during the discussion, to define a cured squint in regard to the angle. His reply was that all patients showing an angle up to five degrees are considered among his cured cases. This five degree angle, added to the five plus angle of Kappa or Gamma present in nearly all squints, would give remaining angles of deviation up to ten degrees. Such cases should not be considered cured. At our clinic only cases showing a zero angle, or between zero and five out, are considered cured cases. This angle of five degrees out corresponds to the angle of Kappa.

A study of our treated cases offers some interesting data. Since the opening of the clinic we have had about four hundred patients. These include not only concomitant squints, but also heterophorias, amblyopes, and paralytic squints. For statistical purposes, in our report today, I am using the records of 183 consecutive patients, only. The others have been omitted because of too short, too irregular, or too recent attendance. Neither phorias nor paralytic squints have been included in these statistics.

Of the 183 patients under consideration, 110 were given orthoptic treatment (twenty of these were later operated on); 44 were observation cases, glasses having been recently prescribed; 4 were purely amblyopes; and 25 were post-operative, having received orthoptic treatment only after operation. Included with the treated cases we had three patients who entered our clinic with the angle absent with and without glasses. These patients had done nothing except to wear their glasses for a number of years. With orthoptics we were able to develop third-grade fusion in all three, none having any fusion before treatment.

At this point I would like to report a very interesting case not included in our squint cases. The patient, six years of age, appeared at our clinic with a unilateral convergent squint of 15 degrees due to a complete paralysis of the external rectus. No fusion was present. We operated on this patient, doing a transplant of the inner half of the superior and inferior recti muscles, attaching them to the external rectus muscle above and below, respectively. Six weeks later we did a partial tenotomy of the internal rectus. Now, one year later, this patient has no squint, is capable of rotating the eye outward for 22 degrees, and has developed all grades of fusion.

In the 107 treated cases, the angles of which, before treatment, varied from 5 to 20 degrees (in one case the angle was 25 degrees), the percentage of results is as follows:

17 cases or 16% have straight eyes without glasses
49 cases or 46% showed improvement of more than 10°
37 cases or 34% showed no improvement
4 cases or 4% were amblyopes

The cases with straight eyes with and without glasses we have found to be thirty-one in number, or 30 per cent.

If I were to do as the Northwestern clinic did and include all patients with angles up to 5 degrees, I would show the following results:

33 cases or 30% have straight eyes without glasses
42 cases or 40% have straight eyes with glasses

In spite of including these doubtful cases among the cured, I still do not show the high percentages reported by Northwestern. They reported complete correction of the squint in 50 per cent. of the cases, with glasses, and 42.1 per cent, without glasses. I will attempt to explain this variation in results.

First, however, I want to say a few words about the results reported in my paper last year.

I then listed thirty-four treated cases with ten of these, or 29 per cent. showing the angle eliminated. None of these cured cases had started with an angle greater than 20 degrees. The results the first year were somewhat better than this year, but I will attempt to explain this later. At this point it will be interesting to note, though, that of these ten cured cases of last year, seven in a recent examination were still straight; two were straight with glasses but showed a slight angle without; and one showed a small angle with and without glasses. None of these cases had received any further treatment.

An analysis of our treatment in postoperative cases also speaks well for orthoptics. Of the forty-five cases operated on twenty had had orthoptic training previous to operation. Of these twenty, fifteen are now straight without glasses and five are straight with glasses. Of the other twenty-five cases, which had received post-operative orthoptics only, two are straight without glasses; five are straight with glasses; and, of the rest, some show improvement and others no improvement.

A study of the fusion development in the cases operated on is also interesting. Of the twenty cases which had had preoperative orthoptics, only two had shown any evidence of first-degree fusion previous to operation. After operation we were able to develop third-degree fusion in fourteen and first-degree in six. Of the twenty-five cases having only postoperative treatment, only seven showed any evidence of first-degree fusion in the beginning. We developed third-degree fusion in ten, first-degree in thirteen, and none in two. From this we see that preoperative treatment does something to the eyes which enables them to develop fusion more readily than those which have had treatment after operation only. But treatment after operation is certainly of immense value not only in developing fusion but in stabilizing the eyes and completing a cure when some under-correction or over-correction has resulted.

Of the forty-four cases under observation, eight of these, or 18 per cent., were straight with glasses in less than six months. Only five of these patients, however, showed any tendency to fuse, and then only in the first stage. It impresses me very forcibly when I note how seldom fusion develops spontaneously in patients who have been operated on or in those who have developed straight eyes by wearing glasses.

In trying to explain the reason for the difference between my results and those of Northwestern, I have considered many possibilities. Our results last year were better than this year but still they were not as good as those of Dr. Guibor. I explained this then by the fact that, due to the recent organization of our clinic and the short period of operation, we had comparatively few patients, and those patients were receiving practically private instruction from the technicians I had trained in the routine adopted. Although our cases had not been selected, we were fortunate in having some very favorable material. However, I might say that, even with these circumstances in our favor, we were already beginning to feel the lack of proper equipment.

The reasons for the poor results this year are many. From about sixty patients the first year, the clinic grew to over four hundred. Still making no selection of cases for orthoptic treatment we tried to care for all of these. Our clinic has grown to such proportions that we have finally found it necessary to give treatment every afternoon, and three mornings a week, instead of only two afternoons as in the beginning. However, the patients still receive only one treatment a week in the form of group treatment.

And so we have finally concluded that several factors not conducive to good results are these: first, crowded, weekly, group treatments; second, no selection of cases; and third, the continued use of the stereoscope, which is so poorly adapted to squint of high degrees. These factors certainly indicate plainly enough where part of our fault lies.

CONCLUSIONS

1. Orthoptic treatment of squint is not a new therapeutic measure. All that we investigators can do is to perfect our methods and improve on instrumentation and equipment.

2. The organization of our clinic, among other aims, had as its object the checking of the method adopted at the Northwestern University Orthoptic Clinic.

3. In England and in this country, numerous clinics, properly equipped, are doing splendid work.

4. Proper equipment is essential. Reliance

on any one instrument is a fallacy. The stereoscope especially has been proved inadequate.

5. Weekly treatments in groups have proved a failure. Daily treatment is the ideal procedure. If advisable, home treatments may be included for certain special problems.

6. Cases must be carefully selected if one expects good results.

7. A certain definite routine must be developed and the treatment carefully followed step by step. A careful history and examination, with frequent checking of visions, angles, and fusion is essential.

8. Trained technicians must be available to give actual instruction and treatments. Careful medical supervision must be available at all times. In doing this work, one must exercise patience and perseverance.

9. This treatment, administered before operation and certainly after operation, assures us of much better results, both as to parallelism and fusion, than operation alone.

10. Orthoptic treatment is certainly a very valuable therapeutic aid in the management of strabismus. One should not be discouraged too easily because another's methods are not entirely satisfactory and, therefore, condemn the entire treatment. With the proper instruments, a good working routine, and the knowledge of how and when to meet and correct certain conditions occurring in squints in the course of treatment, one is certain to accomplish much with these patients.

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DISCUSSION

Dr. Leo. L. Mayer, Chicago: Dr. Bressler has given us a concise, analytical and unbiased survey gleaned from a wealth of knowledge and experience with the question of orthoptics, which few in the field of ophthalmology may hope to attain. It has been my unusual good fortune to have become interested in this subject in the incipiency of its present reclamation from the past, and in addition, through my connection with both Northwestern University and the Illinois Eye and Ear Infirmary, I have had an opportunity to criticize the methods at both institutions. Since Dr. Bressler's paper is dedicated to the comparison of his results obtained at the Infirmary with those recorded by Dr. Guibor at Northwestern, it seems fitting and pertinent to dwell on this phase of the subject. I certainly must agree that every case of strabismus does not lend itself to re-education by orthoptic methods. However, if one considers the analogy of the patient with headache who comes to us for the consideration of whether glasses are needed, it will readily be realized that not until there is a period of trial may one be sure of whether one patient or another is to receive benefit. To be precise, it is my feeling that after the period of one month during which the oculist has been patient and thorough, the parents have been entirely co-operative, and that patient has been completely in accord—yes, after thirty days trial—a competent orthoptic trainer may be entirely sure whether an individual patient is suitable. Obviously, during this period the ophthalmologist would have sufficient time and facts to answer the contra-indicatory factors which Dr. Bressler has outlined.

Dr. Bressler's technic of routine has been given to you most completely, and yet, as in all medical procedures, after you have heard, read and studied these methods, it will be necessary that you practice on clinical cases and perhaps take a post-graduate course in order to know the details of each procedure before you begin to make progress in the orthoptic care of squint cases. You will recall that such were the conditions in learning the art of refracting, and certainly the physiology and physics of orthoptics is as complicated as, if not more so than that of refraction.

Dr. Bressler has learned much from his unique experience. His differences with Dr. Guibor as to angle measurements, etc., seem to be one of both a qualitative as well as quantitative nature, and because of these, it appears that an explanation of their differences in recorded results is to be found. In addition, as has been said, the facilities at the Infirmary are not entirely conducive to good results.

There is one final point to which I should like to call your attention, which is not stressed in the essayist's report. All authorities report their results in detail on those cases which were helped. But what of those cast aside as showing no improvement? Remember that to begin with, fully 50 per cent. of strabismic patients are not amenable to orthoptic training because of factors which to us at the present time are a long way from being entirely clear. Why should not every undiseased amblyopic eye under proper care enhance in visual acuity to normal? What is fusion, anyway? When these questions are answered our percentage of cures with orthoptic treatment will rise perceptibly. It is to men like Dr. Bressler and to others who are open-minded concerning orthoptic training that we shall look for further knowledge on this subject.

Dr. Louis Bothman, Chicago: I would like to ask Dr. Bressler a question. He states that his results from training of patients who were operated on, who had

had training before operation, were better than on those trained only postoperatively. Is there any difference in the degree of squint? In other words, did these patients have a higher degree of squint and for that reason come to operation sooner? If this is true we can understand why the results were not so good.

Dr. Sanford Gifford, Chicago: I am sorry that Dr. Guibor could not be here to discuss this paper. I think we are all to be congratulated on hearing this report. It is not surprising that the figures from two different clinics should differ considerably. It is important to remember the difference in results obtained in the high and low degrees of squint—the results one will obtain will depend largely on the number of cases of higher and lower degrees included in a series. At Northwestern we took unselected cases, and took them all. There were a rather large number of low degrees of squint. I think the interesting thing in Dr. Guibor's figures was the classification of squint above and below 15 degrees. In those above 15 degrees he obtained only about 16 per cent. good results; in those below 15 degrees he obtained about 80 per cent. of what we considered straight eyes. As to the difference between 5 degrees and zero—it did not seem that we could measure two or three degrees, and it seemed to be so little that when a patient had straight eyes on cover test he was considered to be straight. I should like to know how many of Dr. Bressler's cases were of low and high degree.

Dr. Guibor has another report which will be read to the Committee of the American Medical Association, in which he has attempted to classify cases in such a way as to give a guide as to the method of treatment and the prognosis, and although there is not a large number of cases in this group the results of the classification of squint are interesting. Of course, as Dr. Bressler says, cases of amblyopia in which vision is less than 20/100 or 20/70 are ruled out, as are organic defects of the retina. We can determine a muscle defect at the start. Those cases have a poor prognosis. The good cases are the so-called accommodative squint cases associated with hyperopia in which the angle of deviation becomes less with atropine. These have a good prognosis and in some cases they become straight even without orthoptic training. We had a control group and the ones that became straight were of that type. So if these figures are broken down it will give a different picture.

Our office results are always worse than those in the clinic. It is hard to get patients to come to the office often enough to accomplish anything without undergoing the suspicion of elevating this thing into a racket. In the clinic we feel free to have the patients come three times a week. With our office cases we try to get along with home treatment, which, as Dr. Bressler said, is unsatisfactory. In England the training of technicians is done in a regular course of orthoptic training. In London there are a number of licensed orthoptic technicians, who have been licensed after a course of about a year. They are connected with certain clinics, or run private clinics to which the doctors send patients. I have been afraid to train technicians in our clinic, but if something were done here on the same basis as it is done in England, it might solve the problem. One reason for Dr. Guibor's results, I think, was the fact that his cases were handled by himself.

Dr. M. L. Folk, Chicago: I think Dr. Bressler should be congratulated on his paper. It is the first really sane paper I have heard on this subject, and he has given us conservative figures. In the first papers published they told us that fusion training once a week was enough. I said at the time that I could not see any chance for improvement of squint by that method. Dr. Bressler, however, treats his cases three times a week. Also, in the first papers it was said that 35 or 40 degrees of deviation could be corrected, but Dr. Bressler's report mentions only small degrees of deviation. I think this problem is now being treated in a more logical way, and I believe we will get more conclusive results as we go along.

Dr. Carl Apple, Chicago: I would like to ask a question pertaining to improvement of vision in amblyopic eyes by covering the other eye, in patients over six years of age.

Dr. Catharine Chapman, Chicago: I agree that everyone should be given a trial at fusion before they are operated on, and sometimes that should be quite brief, because it may lead to mental confusion in the patient. I have in mind a 23-year old patient who had alternating squint and was able to get fusion of colors but when fusion of objects was attempted, after making the image fall on the macula with pressure, she tried to fuse the image off at an angle equivalent to her angle of deviation. After operation that image, which was extramacular, gradually faded because that line of vision was straightened, and later on fusion training was useful. At first she was much confused and saw two images with each eye.

Dr. W. H. Elmer, Rockford: I would like to ask if there is any indication for excluding cases on account of age. In one case the use of the vertical prism technic resulted in ability to fuse even at the age of 56. I would also like to know if he notes any improvement in central acuity by the use of this method.

Dr. J. L. Bressler (closing): In answer to Dr. Bothman's question, who wants to know if some of the cases did better after operation who had orthoptic training previously than those who had postoperative training only, and the angle present. If you recall, I reported on 107 treated cases and mentioned that twenty of these later went to operation. There will be more of these 107 cases going to operation, but these twenty have been operated on for two reasons. We could develop first stage of fusion in some only and could get no appreciable reduction in the angle. Most cases operated on after orthoptic training had been attempted had an angle of 30 degrees or more. Those who came to me after operation came to me from other services where I had no control of the case. No angle had been recorded and this was unknown to me. But I should judge that in these cases most angles must have been between 30 and 35 degrees, but I know that those I operated on were over 30 degrees.

Dr. Gifford mentioned that the angle could not be measured when it was low. I do not know why. I developed an instrument at the Eye and Ear Infirmary and with this it is possible to measure angles accurately to 1 degree. If properly done I think the angle can be checked as accurately on this strabismometer as you can by the screen and prism method. Dr. Gifford also asked how many low degree and high degree I had. I did not go into that phase. I did not want to include a lot of statistics, but I know that all the cases cured had 20 degrees or less, except one who had 25 degrees. I am sorry Dr. Gifford did not say anything about group training. I found no improvement with this, nor is the stereoscope adapted to treatment when the angle is greater than 25 degrees. I think training by a technician is the only way it should be done. They should be trained for this purpose and the entire training should be given into the hands of the technician, but medical supervision must be constant; every step must be dictated by the physician and not by the technician himself. There is a technician in New York who was trained in England and at the present time she is doing part time work in the hospital and a part time private office of her own. There is a clinic in Tennessee where the ophthalmologists send their patients without having any supervison over the patient whatever. The patients pay a minimum fee to the optical house which supports the clinic, of which the physician gets nothing.

Dr. Apple asked whether we get any improvement in amblyopia under 6 years. Sometimes yes, sometimes no. It is difficult to distinguish between congenital amblyopia and amblyopic exanopsia. It is higher in degree than congenital, but in those not congenital we have developed improvement varying from 20/200 to 20/25.

Dr. Elmer asked about exclusion of certain ages. Some orthoptists prefer to train them early, some late. Dr. Cantannet will not accept a patient over 35 years of age. We have in my clinic some patients who have had squint and have developed fusion at the age of 26, 24 and 19.

THE HEPATIC LESION IN THYROTOXICOSIS

J. M. MORA, M. D.

CHICAGO

Within the past few years, considerable attention has been focused on the interesting interrelationship between the liver and the thyroid gland, particularly as it concerns thyrotoxicosis. Study of the literature and appraisal of recent work permits four avenues of approach to the problem:

1. Clinical Data—especially as they concern icterus.
2. Studies of hepatic function.
3. Hepatic changes in experimental hyperthyroidism.
4. Actual structural changes in the liver in this disease.

The occurrence of icterus in thyrotoxicosis has been known for many years and has recently been noted with increasing frequency. Beginning with Habershon in 1874, numerous references are found to cases of icterus by Eger, Sutcliff, Eder, and Sattler, to mention but a few. Some described the liver as being of a "bright yellow color, anemic, and in no way nutmegged." In others, the parenchyma was described as being "saffron-yellow." These observations occurred with sufficient frequency to permit their inclusion in more complete descriptions of the disease. Thus Boothby wrote of "the tendency to gastrointestinal crises of nausea, vomiting, and diarrhea, with jaundice as a frequent terminal condition in cases of long duration." He states further:

"Jaundice is not an infrequent accompaniment of the late stage of long continued, gastrointestinal thyroid crises and is distinctly a dangerous sign. In most instances it sems to be an integral part of the syndrome and due directly to the thyroid intoxication. In all probability it is only rarely due directly to cholelithiasis or an independent biliary infection, although such conditions, if present, may be lighted up and rendered acute."

A similar statement may be found in Crotti's monograph. Heilmeyer, among 101 cases of thyrotoxicosis in his clinic, found 6 patients with icterus not explainable upon any other basis. In 8 of Weller's 35 cases there was some reference to jaundice varying from slight to marked, and in 23 out of 107 cases from the Mayo clinic reported by Beaver and Pemberton, icterus was observed.

Of particular interest are those patients in whom evidences of a degenerative hepatitis are so marked as to lead to a diagnosis of acute yellow atrophy. Such a case was reported by Kerr and Rusk in 1922. Their patient was a 39 year old man who had presented typical thyrotoxic symptoms for a number of months. Failing appetite, nausea and vomiting were followed by increasing icterus, extreme weakness, cardiac palpitation, diminished liver dullness, bile pigment in the urine, coma and death. Tyrosin and leucin were not found in the urine. Similarly, Raab and Terplan described the clinical course of a 29 year old woman, who showed jaundice relatively early in the course of exophthalmic

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goiter. Uncontrollable vomiting developed with auricular fibrillation, coma and death. These two cases differ only in degree from those characterized by icterus less marked. This conception of a continuous series of parenchymatous changes of varying severity is of importance in understanding the lesions found in the liver of these patients (Weller).

Studies in Hepatic Function: The functional activity of the liver in clinical thyrotoxicosis has repeatedly been the subject of investigation. Certain of these studies were inspired by clinical observation of impaired function in such patients, made manifest usually by icterus, as previously described.

Hirose, in 1912, reviewed the literature showing that the threshold of galactose utilization without galactosureia is lowered by hepatic cirrhosis and catarrhal jaundice. He found in addition that in patients with exophthalmic goiter he obtained his highest values for alimentary galactosuria. Strauss also discussed the occurrence of glycosuria in exophthalmic goiter and the low threshold of tolerance to galactose in patients with morbus Basedowii.

In 1922, Sanger and Hein compared the blood sugar curves of normal persons with those suffering from thyrotoxicosis. They confirmed the occurrence of abnormal curves in the latter group and concluded that

"the increased utilization of carbohydrate after carbohydrate ingestion, along with the maintained high blood sugar points to an inability to store glucose—most probably a failure of liver storage, due to some toxic change in the liver caused by the disease. This fits in with the results found in thyroid-fed animals and is suggested by clinical cases of hyperthyroidism in which carbohydrate restriction is attempted."

One of the largest series of cases studied from the standpoint of liver function tests was that recorded by Youmans and Warfield in 1926. They studied 44 patients with thyrotoxicosis and the tests used included test of retention (according to the Rosenthal technic), levulose tolerance studies, Widal's hemoclastic crisis test, the icterus index, and glucose tolerance studies. Fifty per cent. of the entire series showed impairment of liver function according to the tests used. Kugelman (1930) on the basis of his own work concluded that the thyrotoxic liver not only suffers severely as a depot for stored glycogen but also has lost the capacity to transform large amounts of levulose to dextrose and to store it. Thus the functional disturbance is concerned with an intermediary phase of carbohydrate metabolism. So constant are the changes in carbohydrate metabolism in this disease as evidenced by a discharge of glycogen from the liver that Willis and I made this reaction the basis of a biological test, using the liver of the white mouse. We found that by injecting the serum of thyrotoxic patients subcutaneously and intraperitoneally into white mice we could render the liver free from glycogen. This work was subsequently confirmed by Himmelberger, who modified the technic of the mouse test and showed that the urine as well as the serum of patients with hyperthyroidism contained a substance capable of disturbing liver function. Other evidence of disturbed function may be quoted. Heilmeyer found the urobilin quotient (urine urobilin/stool urobilin) to be elevated in half of the cases he studied. As tested by the method of Von Bergman and Eilbott, the biliruben-eliminating power of the liver was impaired in each of a group of five cases studied. Lichtman recently noted a disturbance in the oxidation of cinchophen demonstrable in 16 of 20 cases of uncomplicated hyperthyroidism.

Evidence of Hepatic Dysfunction in Experimental Hyperthyroidism: A large proportion of the studies in this field have dealt with the various phases of carbohydrate metabolism. Cramer and Krause showed in 1913, that when small amounts of fresh thyroid gland were administered for 2-3 days to rats or cats who had been on a high carbohydrate diet, the livers were found to contain only traces of glycogen. This effect they found to be due to an inhibition of the glycogenic function of the liver and not to an increased utilization of carbohydrates. Parhon, Kuriyama, and Fukui all found diminished hepatic glycogen in experimental hyperthyroidism. More recently, the suggestion of Buell, Strauss, and Andrus, that the function of the liver in synthesizing glycogen from lactic acid may be impaired in the hyperthyroid individual has been supported by experimental evidence. These investigators found that there was much less glycogen deposition, resulting from lactic acid absorption, in the livers of the thyroxinized than in the normal animals. With pure thyroxin (and also with liver extract), Reinwein and Singer demonstrated an increased use of oxygen by living liver cells when these substances were

applied to them in concentrations of 10^{-8} to 10^{-11}.

Under prolonged thyroid feeding other changes take place in the liver which quantitatively more than offset the loss of weight due to glycogen depletion. This was shown by Simonds and Brandes who rendered dogs thyrotoxic by feeding them large doses of thyroid substance for periods varying from 32 to 100 days. In these dogs the actual liver weight was in every instance greater than the theoretical liver weight as calculated for the final body weight. They suggested that increased functional activity and increased rate of blood flow might explain the failure of the livers of thyrotoxic animals to lose weight to the expected degree, resulting in a relative, if not an actual, hypertrophy. These findings were later substantiated by Hewitt and by Hoskins, who used white mice.

Structural Changes in the Liver have been noted for many years: Farrant stated that the livers of cats and rabbits fed thyroid substance showed fatty degeneration, most marked around the centers of the lobules. Hashimoto described parenchymatous degeneration of the liver cells about the efferent veins, varying from fatty degeneration to necrosis. Egar (in 1880) described a liver as being atrophic, with saffron-yellow parenchyma, and microscopically exhibited lipoidosis with only a few areas of intact liver cells. Other observers described cases resembling atrophic cirrhosis. Marine and Lenhart stated that in a significant number of long standing cases (of exophthalmic goiter) coming to autopsy cirrhosis of the liver was observed. In the gross, such livers are reduced in volume, sometimes smooth, sometimes slightly granular and again distinctly hobnailed. The extent of the connective tissue increase varies from slight thickening of the portal spaces to well marked fibrous bands. The liver cells usually exhibit some degree of fatty metamorphosis.

The most critical of recent work is that of Weller, who studied very carefully a large series of cases and who called attention to what is apparently a characteristic lesion in the liver in thyrotoxicosis. Much of his work was subsequently substantiated by Beaver and Pemberton.

Two types of hepatic change have been observed, the acute and chonic. The acute changes are characterized by fatty lesions and central or focal necrosis. Such lesions occurred in all but 9 of the 107 cases (91.5%) reported by Beaver and Pemberton. It is difficult to fix the exact role of these acute changes because of their frequent occurrence in a variety of conditions other than thyrotoxicosis; on the other hand it is impossible completely to ignore them in the face of such a high percentage of association. Furthermore, experimental evidence confirms their importance, and they undoubtedly play an important role in the pathogenesis of the chronic lesion to be described presently.

The fatty changes were the usual ones seen in fatty metamorphosis of the liver. They usually occupied the central lobular region, although in some instances the periphery was involved.

Actual necrosis, either focal or central, has appeared microscopically so frequently that according to Beaver and Pemberton it seemed to represent an accentuation of the same toxic reactions which usually resulted in fatty changes sometimes progressing to necrosis.

Microscopic examinations of the necrotic areas show hyaline thrombosis of the lobular sinusoids, with necrosis of hepatic cells and collections of polynuclear leucocytes. In some instances the necrosis seems to appear without these changes, in which instances one finds various degrees of nuclear degeneration or complete nuclear lysis with destruction of the hepatic cells in the region of the central vein.

The chronic lesion is the one which has aroused widespread interest and has been designated by Weller as a *chronic patchy parenchymatous interlobular hepatitis.* The milder changes consist of slight enlargement of the islands of Glisson (portal canals) with lymphocytic infiltration. In more marked cases there is notable increase in the connective tissue which enlarges the islands so that the liver lobules tend to be encircled by this tissue and isolated one from the other as in atrophic cirrhosis. From the latter, the lesion being described differs in being irregularly distributed throughout the substance of the liver, many islands escaping entirely, and also showing less bile duct proliferation in the increased stroma. It is suggested that the extensive patchy fibrosis so frequently encountered, having small groups of liver cells scattered through it as in some cases of advanced hepatic cirrhosis, may represent regions in which necrosis was previously present.

SUMMARY

Hepatic changes appear to be an integral part

of the syndrome of thyrotoxicosis. This can be demonstrated clinically by the occurrence of icterus; physiologically, by the increasing evidence of altered hepatic function, experimentally, by the evidence of hepatic dysfunction following administration of thyroid substance and thyroxin; and morphologically by structural changes in the liver, varying in the acute stages from widespread degenerative, fatty and necrotizing processes to the chronic lesion in which the changes are interlobular, irregularly distributed, involving the peripheral portions of the lobule and showing relatively more fibrosis and lymphocytic infiltration than bile duct proliferation. To this lesion the term chronic patchy parenchymatous interlobular hepatitis has been applied.

185 N. Wabash Avenue.

DISCUSSION

Dr. Arnold Jackson, Madison, Wis.: Dr. Mora has given a very interestig presentation of a phase of thyroid disease seldom brought to the attention of the profession. I hesitated about discussing his paper since I knew so little about this subject, but after glancing over the literature it seemed that any contribution might help further our knowledge of this rather unexplored field.

For sixteen years I have been particularly interested in diseases of the thyroid, yet in my experience hepatic lesions have seldom been a factor of clinical importance in exophthalmic goiter.

No mention was made by Dr. Mora, nor does the literature contain any report of liver lesions complicating hyperthyroidism in adenomatous goiter. I do not recall ever having observed jaundice even in the terminal stages of toxic adenomata. If jaundice, as occasionally seen in advanced cases of exophthalmic goiter, was the result of a hepatitis, one might expect the same to be true in the thyrotoxicosis of adenomatous goiter. Because in the late stages of this disease there is both clinical and pathological evidence of changes in the cardiorenalvascular system, one might also expect hepatic lesions to occur.

The fact that jaundice is seen in exophthalmic goiter of long duration leads one to conjecture that in this disease alone there is some specific agent attacking the liver cells.

The finding of pathological evidence of hepatitis in such cases does not, however, necessarily prove that the liver lesion is the result of hyperthyroidism.

As Dr. Mora says, Weller found in studying the liver in 48 selected cases of exophthalmic goiter that 54% showed evidence of well-marked hepatitis, while a control series showed only one case. However,' hepatitis is commonly associated with other diseases. MacCarty and I found that in 81% of the cases of chronic cholecystitis there was also evidence of hepatitis.

There is another point that offers opportunity for argument. Dr. Mora pointed out that in hyperthyroidism the liver is supposed to be glycogen-poor. Is this the result of hepatic lesions, the liver being unable to store sugar in the normal manner? Or, is it not more likely that the heightened body metabolism so stimulates the demands of the tissues for glucose that there is no chance for its being stored in the liver?

To return to the question of jaundice, which has been frequently mentioned as an indication that liver involvement does occur in thyrotoxicosis. In my experience jaundice has been an uncommon sequelae even in fatal cases of Graves' disease, and has only been observed in ten instances. Four occurred in the prelugol era and all in seriously ill patients suffering from prolonged hyperthyroidism. Only six of the ten survived. So far as indicating involvement of the liver in exophthalmic goiter, jaundice, because it is so sedom seen, is not a factor of practical importance. Its presence does, however, suggest a serious prognosis.

The possible factor of cardiac insufficiency affecting the liver might be suggested, but Ossman felt that this condition might be considered apart from hyperthyroidism, because the changes are not those resulting from chronic passive congestion.

Clinical observations do not necessarily support the contention that liver involvement occurs in hyperthyroidism. Pathological studies at the autopsy table, however, have long indicated that this assumption is probably correct. Accumulated scientific and laboratory data lend additional support to this idea, but further proof is essential before we can accept this contention as a fact.

From a clinical standpoint I do not believe that liver involvement is an important factor in most cases of exophthalmic goiter. If the patient does not survive thyroidectomy the cause may usually be explained on the basis of surgical error, or hyperthyroidism resulting from too brief or too prolonged iodine therapy. Death occurring after toxic adenoma is not so easily accounted for. In fact, barring those that result from some mistake on the part of the surgeon, or those due to cardiac failure, no one is able to explain or prevent some mortalities. Cerebral involvement is suggested by twitching of the extremities and nervous irritability which is soon followed by drowsiness, coma and death. In some diseases and in certain conditions as water intoxication there is a definite relationship between disturbances in the liver and in the brain. It may be that some deaths occurring after thyroidectomy for toxic adenoma are a result of hepatic lesions and subsequent cerebral involvement.

I should like to compliment Dr. Mora for leaving the beaten path and presenting a phase of thyroid disease that offers an opportunity for real conjecture and discussion. I wish to thank the committee for the opportunity of listening to and the privilege of discussing this interesting presentation.

With your permission I will present sildes of three cases of advanced exophthalmic goiter in whish jaundice occurred, and two of toxic adenomata seriously ill but with no evidence of jaundice.

Dr. J. M. Mora, Chicago (closing): I do not think we ought to leave the impresion that it is very easy

to pick out cases in which the liver is involved. Those of us interested in thyroid work have been seeking the answers to many questions. It is difficult to study the liver, to which so many things happen. When we speak of liver function tests we know we are stepping on dangerous ground. There is no one test that will give us all the information on what is going on in the liver. It is true that jaundice is not a very frequent occurrence in cases of thyrotoxicosis, but there must be some change that goes on, because in so many of these cases that come to autopsy there are many microscopic lesions which do not occur in cardiovascular cases. Men like Beaver and Pemberton have noted that the changes that are found in the thyrotoxic patient are in the periphery of the liver lobule, while in patients who die of some other condition they are usually found in the center of the lobule. We are also interested in finding out what happens in thyroid crisis. It may perhaps be due to some liver damage.

SIGNIFICANCE OF ELECTROCARDIOGRAPHY IN CHILDREN

MATTHEW M. LEWISON, M. D.
CHICAGO

Electrocardiography, although used extensively in the diagnosis of cardiac conditions in adults, is a procedure very little resorted to in the diagnosis of heart disease in children. Because so much emphasis has been placed in the current literature on the diagnosis of coronary and degenerative or sclerotic heart disease by means of the electrocardiograph, one forgets to realize that it can also be used in inflammatory and conductive disturbances and affections of the heart, which are the more common cardiac disorders encountered in childhood and infancy. Of course the taking of electrocardiographs in children is not to be advocated as a substitute for the clinical methods of study of heart disease, but to be used in a confirmatory manner. The electrocardiograph gives valuable information concerning the condition of the heart muscle and also of the conductive system. It tells where the origin of the cardiac impulse takes place and also as to the manner in which the impulse is transmitted to the auricles and ventricles, all of which information cannot be obtained by purely clinical methods.[1] Electrocardiography in children has its limitations such as the difficulties encountered in having an infant stay quiet; the making of electrodes in the right shape and size to fit on small extremities, etc. Also, not enough work has yet been done to establish the standard form and time intervals of the graphs in normal children. It is known, however, that the auriculoventricular conduction time, or P-R interval is shorter in children than in adults and that all of the deflections, especially the T wave, are of a greater amplitude than in adults.[2]

The heart conditions occurring in children in which the electrocardiograph can be used as an aid in diagnosis are, first; acute rheumatic fever with heart involvement; second, arrythmias; third, congenital heart lesions; and fourth, post infectious myocardial diseases such as occur following diphtheria, scarlet fever, etc. In discussing the use of the electrocardiograph in rheumatic infections, it is best to divide the heart lesions into: those occurring during an active attack; and those present during a quiescent period, as a result of some previous infection.

As has been pointed out repeatedly in the current literature, the heart is involved in a very high percentage of cases of active rheumatic fever. Cohn and Swift examined 37 cases of acute rheumatic fever and found the heart affected in 35 of these cases.[3] Pomerance and Frucht examined 31 cases and found 28 cases with a prolonged P.R interval signifying heart damage.[4] This cardiac involvement is supposed to be a pancarditis with the infection extending to all three layers of the heart, namely; the pericardium; endocardium; and myocardium. Where the valves are involved, one can usually diagnose the condition clinically, and where the pericardium is involved, one can also make a clinical diagnosis, but as a rule the pericardial inflammation is so mild and of such a transitory nature, that it frequently requires an experienced cardiologist to discern its presence. In the case of myocarditis, however, the electrocardiograph is the chief weapon in the detection of any pathology present. The presence of the signs of myocardial damage with the characteristic changes in the electrocardiograph are so constant during an attack of acute rheumatic fever, that Master and Jaffe have been able to differentiate this condition from active rheumatoid arthritis in adults by means of the electrocardiograph.[5] According to Swift and Cohn the electrocardiographic changes during an attack of acute rheumatic fever are: first, a prolongation of the P.R interval; second, a widening of the QRS complex; and third, irregularities of the cardiac rhythm.[6] The presence of a prolonged P-R interval on the

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electrocardiogram indicates an early heart block and although this prolongation may be due to a variety of infections it is most commonly found in rheumatic heart disease. Pomerance and Frucht reported a case of acute rheumatic fever with a complete heart block in which an accelerated ventricular rate was present, making it impossible to make a clinical diagnosis.[7] Because an early heart block cannot be discovered clinically, the electrocardiograph makes it possible to determine its presence and thus prognosticate as to how long a patient with acute rheumatic fever should stay in bed. The presence of electrocardiographic findings does not always correspond to the temperature and may be present when the child is entirely afebrile. When electrocardiographic findings are present, the child should be made to stay in bed for a long time in spite of the absence of temperature and clinical findings. On the other hand the patient may run a febrile course and still no electrocardiographic findings be present, in which case he should also be made to stay in bed until afebrile. The presence of signs of myocardial involvement are of such a transitory nature, that one should take repeated electrocardiographs to find them. The degree of heart block in acute rheumatic fever may vary from just a slight prolongation of the auriculoventricular conduction time to a complete dissociation of the auricles and ventricles, but it is in the cases where only the early heart block is present with no clinical findings that the electrocardiograph plays such an important rôle.

The changes in the QRS complex during an attack of acute rheumatic fever are chiefly in the S-T interval, where either a high or low take-off of the T wave may be present.[8] Slurring or notching of the QRS complex, widening of the QRS complex, and inversion of the T wave, other signs of myocardial disease may also be present. The cardiac irregularities most commonly present in acute rheumatic infection are premature auricular contractions and extraventricular systoles.

In cases of rheumatic heart disease in children during the quiescent stage, the electrocardiographic findings are of not such great importance as in the acute stages. However, here also the presence of signs of myocardial degeneration such as lengthening of the P-R interval, slurring of the QRS complex, inversion of the T wave and axis deviations, aids the doctor in determining how to treat the patient and also to prognosticate as to the future life of the patient. In these cases the electrocardiograph acts as a confirmatory measure of the clinical observation of valvular conditions, rather than actually aiding in the diagnosis. Thus, in mitral stenosis, the electrocardiograph will show a right axis deviation with a notched or enlarged P wave, whereas in aortic valvular lesions, a left axis deviation with no enlargement of the P wave is obtained. Because the wall of the chest of a child is so thin, the heart tones and murmurs are transmitted loudly in auscultation, resulting in the less important murmurs such as the Austin Flint murmur in aortic regurgitation and the Graham Steele murmur in mitral stenosis being transmitted more loudly than the more important murmurs. Also hemic murmurs are very prominent in children. In these cases the electrocardiograph will show the true state of affairs in the heart. However, in cases of children with milder degrees of rheumatic heart involvement, the electrocardiograph may show no changes at all. In a series of cases of patients with old rheumatic heart disease which I examined at one time, I found that those showing marked myocardial changes, never did improve clinically while others with less marked changes, did.

In cases of congenital heart disease, the electrocardiograph gives confirmatory evidence of the presence of the lesion. In congenital heart block where a rapid rate sometimes masks the diagnosis, the electrocardiogram clinches the diagnosis. The electrocardiogram in cases of situs inversus or dextrocardia, is as diagnostic as the x-ray. As a rule the congenital lesions, except for a patent foramen ovale, are beyond the right ventricle so that one usually gets a marked right axis deviation on the graph. I recall a case of little infant with cyanosis and a marked systolic murmur heard over the entire precordium in which the diagnosis of congenital heart disease was made and in which the electrocardiagram showed no abnormal findings. The child subsequently improved and the murmur disappeared showing that the pathology was not as serious as could be predicted from the clinical findings. The electrocardiograph does not, however, give any aid in the diagnosis of the kind of a congenital heart lesion that may be present.

Whereas clinically only 70% of the cardiac arrhythmias can be diagnosed, the electrocardiograph will make the correct diagnosis in 100% of the cases.[9] Sinus arrhythmia is very common in children and is sometimes present to such a marked degree, or accompanied by so many extra systoles that it can be confused with auricular fibrillation clinically. The electrocardiogram in these cases will always cear up the situation. From the standpoint of prognosis, this is important because sinus arrhythmia and extra systoles in an infant do not indicate serious cardiac damage. In auricular fibrillation one should always take an electrocardiogram as a confirmation of the clinical diagnosis. The most common serious disorder in childhood, however, is heart block either partial or complete. This may result from a rheumatic or diphtheritic infection, but most often rheumatic, and occasionally when accompanied by alternate extra systoles it is due to an over-dosage of digitalis. Thus in digitalizing a patient electrocardiograms should be taken during the course of the treatment so that one knows when the saturation point has been reached. The electrocardiogram demonstrates heart block from the earliest stages where a slight prolongation of the auriculoventricular time is present to the last stages where one gets a complete auriculoventricular dissociation. Just as in adults, the electrocardiogram will diagnose all of the arrhythmias occurring in chidren. The advantage of making the correct diagnosis of an arrhythmia in children over that in adults, is that in the former they are in the process of being produced, while in the latter they are the result of an infection present some time ago.[10]

In diphtheria we have both the severe fatty degeneration of the myocardium and also the milder inflammatory type in which one gets an interstitial myocarditis. It is in the milder types of involvement, where physical examination yields insufficient evidence of the degree of cardiac damage present, that the electrocardiogram will sometimes show signs of myocardial degeneration such as notching or widening of the QRS complex and inversion of the T wave and thus aid one in determining how long a patient with diphtheria should be restricted to bed. Nathanson states that if an inversion of the T wave is found during convalescence from diphtheria, the patient should be required to stay in bed until there is a restoration of the normal upright T wave.[11] This method may fail, however, and in some cases death may ensue even when a normal electrocardiogram is obtained.

There are reports in modern literature of electrocardiographic studies made in other infections such as pneumonia,[12] scarlet fever, etc., but as yet nothing of importance has been found, except that the heart is involved during the course of the disease. The electrocardiogram has also been used to confirm the diagnosis of pericardial effusion in which case, one gets a low voltage picture with low amplitude of all of the defections.

Concluding, I wish to state that an attempt has been made in this paper to show the place of electrocardiography in children and the conditions where it may be applied. Since the most commonly met with heart conditions in children are the result of rheumatic infection, a great deal of space has been devoted to that subject. I have attempted to show that the electrocardiograph plays its most important role in the control of children afflicted with active rheumatic heart disease where the conducting system of the heart is involved and where an early heart block cannot be diagnosed clinically. The electrocardiograph also has its place in the diagnosis of the various arhythmias in children and in the confirmation of the diagnosis of valvular conditions such as mitral stenosis, etc.

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DISCUSSION

Dr. H. William Elghammer, Chicago: Electrocardiography is a timely and important subject in pediatric practice. I have read Dr. Lewison's paper and enjoyed it very much. He has presented the subject clearly and has covered the literature very well.

There is a great need for further research work to establish normal electrocardiographic findings and standards in healthy children.

My own experience with electrocardiograms has been mostly in cardiac pathology due to rheumatic infection. Clinically, we have come to recognize the systemic nature of this disease and have attempted to make early diagnosis of cardiac involvement. We have often verified this with the findings of definitely prolonged P-R intervals. Single cardiograms may be misleading. Only when abnormal graphs are found repeatedly and correspond with clinical findings do they have diagnostic importance.

In chronic valvular disease the electrocardiograms are of less diagnostic value. We often obtain normal graphs. In cases of combined mitral and aortic lesions, many times no ventricular predominance is evidenced in graphs. This most likely is due to the balance between right and left ventricular hypertrophy. Early pathological changes of the mitral valve most likely cause stenosis. This is shown by right axis deviation and changes in the P wave long before mitral stenosis can be detected by physical examination.

The anatomical-pathological condition of the myocardium is well demonstrated by electrocardiography; in fact, this is often the only method which will show myocardial damage. This is particularly true when the rheumatic granulomae are situated close to or in conduction fibers. It is rather surprising the disproportion that exists between myocardial damage as evidenced by electrocardiogram and the prognosis as to decompensation and cardiac failure. The acute reactivation of the rheumatic lesions, associated with marked perifocal reactions, determines the prognosis. This, I believe, can be best demonstrated by clinical examination, general impressions of the patient and by erythrocyte sedimentation rate.

I feel that electrocardiography is of great value in the early stages of rheumatic infection and during the acute stages of contagious diseases in childhood. In the study of cardiac diseases in children this method is a valuable adjunct to our usual clinical methods of examination. Cardiography is an open field for further research and I am sure will bring us much valuable information in the future.

Dr. G. F. Weinfeld, Ravinia: This subject is an extremely interesting and important one. After all, the major issue in dealing with children with rheumatic fever is the determination of the presence of any activity of that infection. Any clinical measures which would reveal the presence of such infection would be a very valuable aid. It has been pointed out particularly in adults, as Dr. Lewison mentioned, that a large majority of individuals with active rheumatic infection show very definite electrocardiographic changes. Shookoff, Weiss, Shapiro, and others have pointed out that these changes also occur in children during an acute rheumatic infection. I disagree with Dr. Lewison in that these electrocardiographic changes occur in children with the frequency and clarity which he implies to be the case.

At the University of Illinois for the past six years we have been interested in following children during the time of active infection and during the time of quiescence. Some of our children have been followed through a six-year period. Some have had as many as ten electrocardiograms during that six-year period. Much to our disappointment, the data we have received has been inconclusive and in most instances without diagnostic benefit. It is true that in sinoauricular heart block and auriculoventricular heart block the electrocardiogram has been of invaluable assistance. But in those cases in which we have been sure that definite activity is present, very few of them have shown the type of changes that Dr. Lewison pointed out. I would be interested in hearing what percentage of his cases have revealed these changes. We have sought particularly for prolongation of the P-R interval as an indication of active infection. A prolongation of more than .18 second was noted only once in a series of 41 children whom we have followed over a period of years with repeated electrocardiograms and clinical observations. I am not sure that one can definitely diagnose the presence of mitral stenosis by means of the electrocardiogram. We have had children who during the course of observation have not shown these changes, but who presented otherwise definite clinical evidence of this lesion. I believe, however, that the electrocardiogram may in many instances prove to be of great value as an adjunct in the study of children with acquired and congenital lesions.

Dr. Matthew M. Lewison, Chicago (closing): The subject of electrocardiography in children is of comparatively recent origin. The question of whether one gets a definite prolongation of the PR interval depends on whether the inflammation is near the conducting system or not. That is, you might have a rheumatic infection of the myocardium with no involvement of the conducting system in which case you would not get an involvement of the PR interval. In the cases I examined I found a prolongation of the PR interval in rheumatic infection, but the cases I examined I think were too late. Early in the disease is when one is supposed to get a prolongation of the PR interval. Perhaps I did not take enough repeated electrocardiograms. One should take them daily, but I did not get a chance to do so on these patients. The men who have reported the high percentage of cases in which one gets a PR interval prolonged in rheumatic fever are the men who have taken daily electrocardiograms. They say that one should take electrocardiograms daily in order to get the findings. The findings may be present one day and absent the next. The most important place where electrocardiograms can be of

use is early in the rheumatic involvement of the heart where no clinical findings are present. If you take the electrocardiogram and find an involvement, you have sufficient evidence to keep the patient in bed whether there is any temperature present or not.

Marriages

THOMAS BERNARD CARNEY, Kewanee, Ill., to Miss Katherine Mary Brugee of Chicago, June 29.

JOSEPH GREENGARD to DR. DOROTHY HUTCHINSON WELKER, both of Chicago, July 17.

ALLEN RICHARD MORRISON, Maywood, Ill., to Miss Evelyn Marie Herbst at Chicago Heights, July 6.

Personals

Dr. Grover C. Brown, Sainte Marie, has been appointed managing officer of the Jacksonville State Hospital.

Dr. Frederick H. Falls, Chicago, discussed "Early Diagnosis of Cancer of the Uterus" before the Coles-Cumberland Counties Medical Society, July 12.

Dr. Harold O. Jones was chosen president-elect of the Chicago Gynecological Society at the annual meeting, June 7, and Dr. Edward L. Cornell was installed as president.

Dr. Rolland L. Green, Peoria, president-elect of the Illinois State Medical Society, was guest of honor at the annual outing of the Peoria City Medical Society, June 27, at Luthy's Alps.

Dr. Margaret W. Gerard, assistant clinical professor of psychiatry, Division of Biological Sciences, University of Chicago, has been promoted to be associate professor under the psychiatry program recently instituted at the university.

The honorary degree of doctor of laws was conferred on Dr. Arthur Hale Curtis, professor of obstetrics and gynecology, Northwestern University Medical School, by the University of Wisconsin, June 24.

Thomas C. Grubb, Ph. D., has been appointed a member of the professional staff of the Illinois State Department of Health and will conduct research in the control and prevention of disease. Dr. Grubb is a graduate of the University of Chicago and in 1934 shared the Ricketts prize at the university for meritorious work relating to the diphtheria bacillus.

At the annual meeting of the Chicago Urological Society the following officers were elected: President, Ben E. Fillis; vice-president, William J. Baker; secretary-treasurer, C. Otis Ritch.

News Notes

—The state department of health announces an appropriation of $45,000 to extend for two years its work on trachoma among the indigent of the southern fourteen counties of Illinois, which has been in progress for more than a year under the supervision of Dr. Harry S. Gradle, Chicago. The state department of public welfare and the Illinois Society for the Prevention of Blindness are cooperating in the project, which includes the operation of out-patient clinics for treatment and preventive work.

—Medical examination of adults for heart impairment and tests to determine the skill of automobile drivers were offered free to all visitors to the state fair in Springfield, August 17-23, as special features of the exhibits on health and safety, according to the state health department. Each person who takes the test will receive a record showing his reaction time and folder indicating a safe speed for him, together with driving rules. The Sangamon County Medical Society is cooperating in the heart examinations, and Dr. John J. McShane, chief of the state division of communicable diseases, was in charge.

—About 600 cases have been studied to date in a survey of maternal mortality being conducted by the maternal welfare committee of the Chicago Gynecological Society. It is hoped to continue the study until data on about 1,000 cases have been accumulated. Sixty-eight physicians compose the committee, which represents the seventy-six hospitals in Chicago doing obstetric work. The executive committee has nine members, five appointed by the society, three elected from the membership and the president of the board of health; this committee outlines the policies and methods of procedure. All information is obtained by mail; in 1933 all but one case report blank was returned, and in 1934 all but twelve. Information for 1934 is still being received, however. The board of health supplies

the secretary with a copy of any death certificate in which pregnancy is mentioned. The secretary in turn mails a form to the hospital representative, who fills out the blank and returns it to the secretary. In case the woman dies at home, the form is mailed to the attending physician.

—Principle features of the recently revised minimum sanitary requirements of milk are announced by the state department of health as follows:

1. The short time-high temperature method of pasteurization is legalized. This method requires that milk be heated to not less than 160 F. and held at that temperature for not less than fifteen seconds.

2. Plans for contemplated pasteurization plants must be submitted to the state department of public health and plants must be approved and a certificate of approval issued before pasteurized milk can be legally sold or distributed.

3. Pasteurized milk must not be delivered to consumers in any container except that in which it left the pasteurization plant. This makes illegal the retailing of dipped milk bought in bulk from pasteurizing plants and sold as a pasteurized product. Hotels and restaurants that serve milk to customers are considered consumers under the law.

4. The state department of health is required to set up and enforce the minimum sanitary requirements for down-state pasteurization plants.

5. Representatives of the department are permitted to enter and inspect any pasteurization plant at any time.

The new standards eliminate the requirement of filtering milk prior to pasteurization and prohibit filtration through cloth or wire after pasteurization. They also require the heating of foam on milk in the pasteurizing vaults to pasteurization temperatures.

—Dr. Henri Coutard, chief of the department of roentgentherapy of cancer at the Curie Institute, University of Paris, France, will deliver the twelfth Lewis Linn McArthur lecture of the Frank Billings Foundation of the Institute of Medicine of Chicago in the theater of the Chicago Woman's Club, 72 East Eleventh Street, at eight o'clock on Tuesday evening, October 1. The subject of his illustrated lecture will be "The Conception of Periodicity as a Possible Directing Factor in the Roentgentherapy of Cancer."

—Illinois will receive $425,000 from a federal appropriation of $3,450,000 for a public health survey in representative urban and rural communities under the Works Progress Administration. A house to house canvass will be made to determine the prevalence of chronic diseases and illnesses of long standing in samples of the general population of various income levels. Physical examinations of a smaller sample of the surveyed persons will be made by physicians to supplement available hospital records to evaluate the accuracy of the canvass reports. A survey of medical facilities will also be made, with especial reference to chronic diseases.

Deaths

ELMER SHERMAN ALLEN, Arcola, Ill.; Rush Medical College, Chicago, 1895; a Fellow A. M. A.; formerly mayor and president of the school board; aged 70; died, June 26, in the Memorial Hospital, Mattoon, of meningitis following an injury of the head in an automobile accident.

FRANK ALLPORT, Chicago Medical College, 1876; secretary, 1895-1896, and chairman, 1901-1902, of the Section on Ophthalmology of the American Medical Association; for several years chairman of the Committee on Conservation of Vision, and in 1903 member of the House of Delegates; practiced for many years in Minneapolis and in Chicago; formerly professor of clinical ophthalmology and otology, University of Minnesota Medical School, Minneapolis, and at his alma mater; past president of the Minnesota State Medical Association, the Chicago Ophthalmological Society and the Chicago Otological Society; fellow of the American College of Surgeons; at one time oculist and aurist to the board of education in Chicago; formerly on the staffs of the Wesley and St. Luke's hospitals, Chicago; served in the medical reserve corps; aged 78; died, August 3, in Nice, France, where he had been living for several years.

ALPHONSO TAFT ARBUCKLE, Danville, Ill.; Rush Medical College, Chicago, 1886; aged 80; died, July 10, in the Lake View Hospital, of pneumonia.

ALPHONSE LEON BEARDSLEE, Chicago; State University of Iowa College of Medicine, Iowa City, 1918; aged 41; died, May 5, of lobar pneumonia.

LEWIS MUNTHE BERG, Chicago; Tulane University of Louisiana Medical Department, New Orleans, 1890; a Fellow A. M. A.; aged 79; died, July 31, of chronic myocarditis and arteriosclerosis.

ANDREW J. BRISLEN, Chicago; Northwestern University Medical School, Chicago, 1895; a Fellow A. M. A.; at one time instructor in anatomy at his alma mater; on the staff of the Woodlawn Hospital; aged 61; died, July 23, in the Albert Merritt Billings Hospital, of cerebral thrombosis.

WILLIAM L. CALLAWAY, Chicago; Barnes Medical College, St. Louis, 1897; member of the Illinois State Medical Society; formerly professor of clinical medicine, Chicago College of Medicine and Surgery, Ben-

nett Medical College and Loyola University School of Medicine; on the staff of the West Side Hospital; aged 65; died, July 24, of angina pectoris.

CHRISTUS A. DEREBEY, Chicago; Northwestern University Medical School, Chicago, 1897; member of the Illinois State Medical Society; aged 78; on the staff of the Belmont Hospital, where he died, June 25, of chronic endocarditis and arteriosclerosis.

ERNEST L. DOW, Rock Falls, Ill.; Rush Medical College, Chicago, 1887; aged 73; died, June 29, of heart disease.

I. CLARK GARY, Chicago; Northwestern University Medical School, 1889; a Fellow A. M. A.; founder and superintendent of Peoples Hospital; aged 77; died, July 4, of coronary thrombosis.

RICHARD FRANKLIN HINMAN, Chicago; Bennett Medical College, Chicago, 1912; a Fellow A. M. A.; on the staffs of the Garfield Park Hospital and the Frances Willard Hospital; aged 60; died, July 20, of brain tumor and arteriosclerosis.

EDWIN RAYMOND LE COUNT, professor of pathology in Rush Medical College since 1892, died in Chicago at the Presbyterian Hospital August 23 of coronary thrombosis. Dr. Le Count has born in Wisconsin, April 1, 1868. After graduation from Carroll College he attended Rush Medical College and received his M. D. degree in 1892. Thereafter he pursued graduate studies in Johns Hopkins Hospital in 1893 and 1894, in the Pasteur Institute in Paris in 1896 and in Berlin in 1905. He served at various times as attending pathologist in the Cook County, Presbyterian and St. Luke's hospitals and also at St. Elizabeth's and St. Anthony's hospitals. He was a member and once president of the American Association of Pathologists and Bacteriologists and was a president of the Association for Cancer Research. He was also a member of the American Association for the Advancement of Science and of the Society of American Bacteriologists. In the American Medical Association he served as a member of the House of Delegates in 1903 and as chairman of the Section on Pathology and Physiology from 1920 to 1921. He was the author of numerous contributions to the literature of his specialty, particularly on such subjects as the relative frequency of the various forms of coma, automobile injuries, skull fractures, air and fat embolism and blastomycosis. In his long service as pathologist to so many institutions he performed approximately 20,000 postmortem examinations. He was noted particularly for his training of young men in pathology, and many of the younger leaders in this field today were associated at various times with him. At the time of his death he had completed postmortem records extending over a period of twenty-five years, completely indexed and annotated, and presented these as a permanent contribution to the library of Rush Medical College.

GEORGE LEININGER, Chicago; University of Wooster Medical Department, Cleveland, 1881; member of the Illinois State Medical Society; formerly superintendent of the Chicago State Hospital; aged 79; died, July 17, of carcinoma of the intestine.

ARTHUR THOMAS LEIPOLD, Moline, Ill.; State University of Iowa College of Medicine, 1907; a Fellow A. M. A.; vice-president Illinois State Medical Society, 1926-1927; former president of Rock Island County Medical Society; medical director of Rock Island County Tuberculosis Sanitarium; on staff of the Moline Public Hospital; director of Moline Tuberculosis Clinic; aged 50; died, July 4, of essential hypertension and nephritis.

JOHN J. LENCE, Jonesboro, Ill.; University of Louisville (Ky.) Medical Department, 1892; Missouri Medical College, St. Louis, 1893; for many years county coroner; aged 66; died, June 28, of cerebral hemorrhage.

JOHN WILLIAM LEWIS, Chicago; Bennett College of Eclectic Medicine and Surgery, Chicago, 1902; aged 61; died, May 22, of septicemia, which developed from a cut on the palm of his right hand.

WILLIAM SHERIFF ORTH, Chicago; Rush Medical College, Chicago, 1890; a Fellow A. M. A.; formerly on the staffs of the Alexian Brothers' Hospital and the Grant Hospital; aged 70; died, July 16, in St. Luke's Hospital, of cardiovascular renal disease.

OTTO L. SCHMIDT, an educator, a medical historian of considerable note, a sportsman, and a beloved family physician, died in Chicago, August 20, of carcinoma of the prostate with metastasis, aged 72. Dr. Schmidt was the son of a physician, Dr. E. S. Schmidt. He received his M. D. degree from the Chicago Medical College in 1883 and after postgraduate work abroad took up the practice of medicine in Chicago; a Fellow A. M. A. He was a consultant to the Alexian Brothers Hospital and a member of the staff of other Chicago institutions. From 1915 to 1919 he served as chairman of the Illinois Centennial Commission. He was a past president of the Institute of Medicine in Chicago, the Illinois Historical Society, the Illinois Historical Library and the Chicago Historical Society. He was also president of the Inland Lake Yachting Association. Dr. Schmidt served as a member of the Board of Education of the City of Chicago during the Dever administration and took a prominent part in maintaining the ideals of education during the attacks on Superintendent of Schools William McAndrew. He was decorated by the Austrian government in 1923 for postwar relief work. His two daughters are wives of physicians.

CHARLES WILBUR SEEVER, Sheldon, Ill.; Chicago College of Medicine and Surgery, 1909; served during the World War; aged 54; died, July 4, in the Garfield Park Hospital, Chicago, of cirrhosis of the liver.

EUGENE THOMPSON, East St. Louis, Ill.; Missouri Medical College, St. Louis, 1890; member of the Illinois State Medical Society; served during the World War; aged 70; died, June 19, of cerebral hemorrhage.

THOMAS W. THOMPSON, Xenia, Ill.; Rush Medical College, Chicago, 1884; aged 77; died, July 5, of cerebral hemorrhage.

ALFRED CHRISTOPH CARL WIEBUSCH, Steeleville, Ill.; Homeopathic Medical College of Missouri, St. Louis, 1906; member of the Illinois State Medical Society; past president of the Randolph County Medical Society; served during the World War; aged 54; died suddenly, June 24, of cerebral hemorrhage.

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